

Aspects of Roman Siegecraft

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Abstract

The present work represents a re-assessment of Roman siegecraft, based on the twin foundations of a comprehensive collection of historical narratives, and a thoroughgoing discussion of the archaeological evidence. The historical material is presented chronologically, and analysed statistically in order to test various common assumptions, such as the supposed Roman predilection for blockade as the principal besieging strategy, and circumvallation as the principal tactic; the statistical findings are tabulated for ease of reference. This provides a context for the ensuing study of the archaeological material, gathered and discussed under the three headings of encampments, circumvallations, and embankments. The phenomenon of the embankment is subjected to particular scrutiny, in order to question the common acceptance of Napoléon's tripartite, timber-built design. Separate analyses of Roman artillery and siege-machinery round off the work, exposing several persistent fallacies concerning the operation and siting of stone-projecting catapults, and discussing the function of the different siege machines. Finally, amongst other myths, the recurring theme of decline in siegecraft is dismissed in the conclusion.

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Introduction:

The Study of Roman Siegecraft

No book-length study of Roman siegecraft exists, nor has the topic ever been scrutinised systematically, in the way that Greek siegecraft has been (e.g., Garland 1974). Nevertheless, it has provoked discussion among German scholars throughout the 20th century. One strand of debate goes back to the appearance, in 1867, of a selection of original poliorcetic texts (Wescher 1867); a different strand originated in the publication of excavations carried out at Alise St. Reine, ancient Alesia (Napoléon III 1866). Both were given a fillip by the compilation of the *Real-encyclopädie*, which continued to provide scholarly exposition of all aspects of ancient siegecraft, from the overviews of Hans Droysen (1909) and Willy Liebenam (1909), via a whole series of articles by Friedrich Lammert (1919-1939), down to Alfred Neumann's entry on "Krios" (1968). The tradition has been continued into the new millennium by Dietwulf Baatz in *Der Neue Pauly* (1999a; 2001).

Besides the *Real-encyclopädie*, one other work has been enormously influential in the study of Roman siegecraft (indeed, of ancient warfare in general); namely, *Heerwesen und Kriegführung der Griechen und Römer* (Kromayer & Veith 1928). In that work, the artillery officer, Major General Erwin Schramm, made only brief remarks on Roman siegecraft as an appendix to his lengthy discussion of Greek "Poliorketik" (1928, 244-245). But, in preparing the individual Roman chapters, Georg Veith and Erich von Nischer included sections on "Festungskrieg" (Veith 1928, 373-376, 442-449; Nischer 1928, 564-567, 600-601).

Some years previously, Adolf Schulten had approached the subject of Roman siegecraft from the evidence unearthed at Numantia. His observations at that site (Schulten 1927), and at Masada (Schulten 1933), Bettir (*ibid.*, 180-184) and Burnswark (Schulten 1914), had wide-ranging implications for Roman military studies, not least in moulding the opinions of men like Sir Ian Richmond. However, a more lively debate centred on the poliorcetic texts, a group of technical manuals of broadly Roman date, describing the construction of various siege machines. The opinion of the scholar Erich Sander, that the texts, taken in combination with other evidence, demonstrated a sharp decline in Roman siegecraft during the Principate (Sander 1934), continued to echo in later work, despite Lammert's crushing rebuttal (Lammert 1938). Study of the ancient texts has continued in the work of Otto Lendle on siege-machinery (Lendle 1975; 1983) and Dietwulf Baatz on artillery (e.g., Baatz 1994), but they have never been integrated with an overview of Roman siegecraft.

It is significant that the single most important monograph on the subject to appear since 1928, Wimmel's study of Avaricum (Wimmel 1974), received no attention from English-language periodicals. Reviewed by Dietwulf Baatz for *Gnomon* (Baatz 1976), and by Jacques Harmand for both *Revue des Études Anciennes* and *Latomus* (Harmand 1974; 1976), it did not even rate a notice in the *Journal of Roman Studies*. The same indifference has greeted Lendle's work on siege machinery, so that his brilliant elucidation of the puzzling devices on Trajan's Column (Lendle 1983, 184-187) has gone largely unnoticed. And Baatz's continuing work on artillery has only achieved currency in English-speaking circles, one suspects, from its relevance to the burgeoning field of military equipment studies (cf. Bishop & Coulston 1993, 80-81, 114-115).

Consequently, it is not surprising that Roman siegecraft has never engendered the same atmosphere of scholarly debate in Britain as in Germany. Anglophone offerings consist primarily of a dozen pages in Webster's *Roman Imperial Army*, largely based on a retelling of Caesar's siege of Alesia and Vespasian's siege of Jotapata (Webster 1985, 239-254); a similar recital in Peddie's *Roman War Machine*, this time of Caesar's siege of Avaricum and Titus's siege of Jerusalem (Peddie 1994, 123-147); and the brief articles in successive editions of the *Oxford Classical Dictionary* (Parker 1949; Marsden

1970; Coulston 1996), which bear no comparison with their detailed yet concise counterparts in *Der Kleine Pauly* (Neumann 1972) and *Der Neue Pauly* (Batz 2001). Recently, Davies has presented a study of the physical remains of Roman siegecraft (2001), but I believe his approach to be misguided and his analysis fundamentally flawed (cf. below, pp. 155, 182, 209ff., 214ff.). Prior to that, the only original contribution in the field was the late Eric Marsden's work on artillery (Marsden 1969; 1971), which was noticeably short on Roman material (cf. Snodgrass 1971, 106f.).

The present work is an attempt to redress the balance somewhat, with a new examination of the archaeological evidence, underpinned by a systematic study of the literary sources. Those two giants of Roman military studies, Alfred von Domaszewski and Sir Ian Richmond, recognised the special relationship between the literary sources and the physical remains. Both men were captivated by the conjunction of the two at Masada. It was the technicalities of castrametation that exercised von Domaszewski, then engaged in elucidating Hyginus's *de munitiōibus castrorum*, and he was quick to appreciate Masada as "eines der merkwürdigsten Zeugnisse für die Technik des römischen Lagerbaues" (Domaszewski 1909, 220). But it was the wider picture that informed the work of Richmond: the marriage of the material evidence, gleaned from archaeology, with his wide-ranging knowledge of the Roman army, culled from diligent study of the literary sources (e.g., Richmond 1955; 1982). An appreciation of the former requires a grounding in the latter, in order to bring a sense of perspective.

However, in my view, an understanding of Roman siegecraft does not require prior knowledge of the siegecraft of other cultures or nations. It is well-known that the Romans utilised and developed the technology of their Greek neighbours; indeed, it is one of Vitruvius's regrets that so many of his sources are Greeks and so few Romans (*De arch.* 7.praef.14). Nevertheless, an analysis of Alexander the Great's siegecraft, for example, is of questionable relevance to a study of Roman siegecraft. Occasionally, I have found it helpful to point up similarities with Greek siegecraft, but it is unnecessary to expound at length on a subject already well covered by specialists (e.g., Garland 1974). It seems to me even less defensible to discuss the siegecraft of nations further removed from the Romans. Gilliver has thought it relevant to preface her chapter on

Roman siege warfare with remarks on Assyrian and Persian siegecraft (1999, 131-132; likewise, Davies 2001, 47-59). In my opinion, this is out of place in a work dealing with *The Roman Art of War*. Quite apart from the fact that the interested reader can easily access the material in greater detail elsewhere (e.g., Kern 1999, 29-85), there is no question of a causal relationship between Assyria and Rome. At least, an event from the lifetime of Alexander, retold by a Hadrianic writer for a senatorial readership, has the potential to influence subsequent Roman military actions, but this cannot be said for the likes of Sennacherib's siege of Lachish.

In compiling the "Catalogue of Roman Sieges" (Appendix 1), I have selected those events which the ancient authors describe in reasonable detail. There is, I think, little to be gained from the inclusion of the lists of besieged towns which crop up from time to time in the sources, such as M. Baebius Tamphilus's capture of thirteen named towns in Thessaly in 191 B.C. (Livy 36.13.3-6). Nor do I believe that any useful conclusions can be drawn from the bare mention of an event, such as the repeated capture of Nisibis and Ctesiphon during every Roman invasion of Mesopotamia (e.g., Cass. Dio 68.18.2 and 68.28.2, for Trajan's capture of those two towns in A.D. 115/116).

Of course, it is impossible to take account of the unnamed towns which the sources often briefly mention; for example, Plutarch, on the four hundred towns which M. Porcius Cato allegedly captured in Spain in 195 B.C. (*Cato Maior* 10.3), or Suetonius, on the "more than twenty towns" in Britain captured by Vespasian in the 40s (*Vesp.* 4.1). These and others, such as the two Armenian forts which Cn. Domitius Corbulo took in A.D. 59, one by force, the other by blockade (Tac., *Ann.* 14.24), are omitted for lack of useful information. Unfortunately, interesting sidelights cannot easily be incorporated into the catalogue structure, such as the fact that Gabinius, suffering from a shortage of supplies in Illyricum in the winter of 48/47 B.C., was forced to assault forts and towns, but repeatedly failed on account of the bad weather (*Bell. Alex.* 43).

Where archaeological investigation has illuminated our appreciation of a site, this has been noted in the catalogue, with full discussion in the main text. Here, special mention must be made of two sites, Burnswark and Narbata, which undoubtedly saw siegecraft

of some description, but which cannot be fitted into the catalogue's chronological scheme, for lack of dating evidence; these are discussed in the main text (Burnswark: pp. 90ff. and 127ff.; Narbata: 119ff.).

I have made no attempt to exhaustively catalogue the sieges from Rome's regal era, but have entirely omitted material purporting to describe events in the seventh century, and have selectively omitted material from the sixth and fifth centuries B.C. (see further, below, p. 10). The accuracy of much early history is so suspect (cf. Veith 1928, 285-286) that, in the general analysis of siegecraft (pp. 80ff.), I have excluded everything prior to the First Punic War, in what has become standard practice for students of Roman warfare (cf. Roth 1999; Goldsworthy 1996, imposes even stricter limits).

The record is further skewed by *lacunae* in our sources. A glance through the catalogue will reveal decade-long gaps; for the period of the Republic, the 230s, the 220s, and the 120s are entirely absent, and there is a gap between 26 B.C. and 4 B.C.; for the Principate, there are so many missing decades that to list them would be tedious. It seems unlikely that no siegecraft was practised during these periods, which after all saw the continuance of warfare, and we must conclude either that no historian thought the actions worthy of record, or that the relevant historical reports have not survived. Nevertheless, the laws of averages encourage the belief that two hundred and twenty-five individual events will form a representative picture of Roman siegecraft.

A previous version of the catalogue included sixty non-Roman sieges, for comparative purposes, but constraints of space have forced their excision from the final draft. Likewise, the discussion of Carthaginian, Macedonian, Seleucid, Pontic, Germanic, Gothic, and Sassanid siegecraft, which originally formed part of chapter 1, has been omitted, in order to meet the stipulated word-limit.

I have been mindful throughout of Landels' criticism, that, in his own field of technology, many historians fail to examine the sources in detail, and to analyse the Greek and Latin terminology (1978, 7); consequently, I have attempted to do both. I also follow Landels in providing my own translations of the Greek and Latin sources, and for the

same reason as Landels: namely, that existing translations (which may be superior in literary merit) may misconstrue points of technical importance.

Besides a grounding in the historical narratives, the study of Roman siegecraft demands a familiarity with the contemporary technical writers. It would be inappropriate here to enter into a philological discussion of the texts, which have vexed generations of scholars (e.g., Lammert 1928; Lendle 1975; 1983), but their relevance to an understanding of the Roman besieging process should not be underestimated. Similarly, artillery has always cast a long shadow over the subject. From the pioneering work of Schramm (1918) through to Marsden's reinterpretations (1971), the application of these weapons to siegecraft has continued to fascinate. Accordingly, I have included a study of the use of both types of machinery in Roman siegecraft (below, chapters 5 and 6). H.M.D. Parker had already based his *Oxford Classical Dictionary* entry around the use of artillery and machinery (Parker 1949), so it was natural for Marsden to follow suit, when he revised the entry for the second edition (Marsden 1970); only with the recent third edition has an attempt been made to balance this largely literary evidence with the archaeological remains of siegecraft (Coulston 1996).

The historical sources undoubtedly provide a foundation for a study of Roman siegecraft, but it is the archaeological evidence which forms the core. In this, Schulten's work has been fundamental (above, p. 2), and can now be extended with reference to new material accruing from Alesia (Reddé & Schnurbein 1997; Reddé *et al.* 1995) and Cremna (Mitchell 1989; 1995). These are all noted by Coulston (1996, 1405) and Baatz (2001, 21), unfortunately without discussion, owing to constraints of space. Curiously, although Gilliver mentions circumvallations at Alesia, Machaerus, Masada and Bettir, she eschews discussion of the archaeological remains (1999, 148-149), and, although the recent study by Davies (2001) is archaeologically based, his conclusions are quite different from my own. Consequently, I have taken the opportunity to collate and reassess the evidence of the physical remains, according to the three main classes of monument which are encountered archaeologically: the encampments of the besieging armies (below, chapter 2); the circumvallatory works (chapter 3); and the assault embankments (chapter 4).

In general terms, the archaeological evidence for siege encampments, such as it is, tends to support conclusions drawn from the historical evidence. This has important repercussions for sites such as Burnswark, Woden Law, and Hatra, where scholars have been divided as to whether the remains represent Roman sieges. As for the archaeological examples of circumvallation, these display some uniformity of form and layout, as is to be expected from such a functional phenomenon, although there is diversity in the number, shape and size of the associated guard-posts. However, it is with the embankments that most controversy exists, and Rice Holmes's comment, that "the whole subject [of embankments] is very difficult" (Holmes 1911, 607), is as true today as it was last century.

Central to the present study has been an attempt to accurately gauge the usage of different besieging techniques by Roman armies. To this end, each of the 225 Roman sieges has been classified according to outcome and procedure, and the results tabulated in a series of analytical tables. Only by such systematic analysis can the study of Roman siegecraft, and consequently the relevance of the physical remains, be put on a firm footing, with a view to reviving interest in the new millennium.

Part 1:

The History of Roman Siegecraft

The catalogue of Roman sieges (Appendix 1) presents summary outlines of 225 besieging operations, spanning almost 900 years of Roman history. In order to create a framework for basic statistical analysis, they have been arranged into discrete groupings. Statistical objectivity would have been satisfied by arbitrary division into equally-sized groups (e.g., sixteen groups of fourteen). But, in an historical discipline, there is an obligation to respect chronological boundaries, defined in a military context by wars and campaigns. Only in this way can we gain an appreciation of development over time, and highlight any anomalies related to individual military episodes (whether arising from geography or personalities), which may otherwise be lost in the mass of data.

Consequently, the following groupings have been adopted. 1. The early history of Rome; 2. The First Punic War; 3. The Illyrian Wars; 4. The Second Punic War; 5. The Macedonian Wars; 6. The Spanish Wars; 7. The Third Punic War; 8. The Jugurthine War; 9. Sulla to Pompey (early 1st century B.C.); 10. Julius Caesar (mid 1st century B.C.); 11. The Late Republic; 12. The Early Empire; 13. The Jewish War; 14. The Second Century; 15. The Third Century; 16. The Fourth Century.

Chapter 1 is divided into sections, corresponding to the sixteen groupings. Each section begins with a synopsis of the relevant source material, followed by a summary of the siegecraft of the period, a broad discussion, incorporating a critique of modern scholar-

ship, and a brief statistical analysis of the grouping. At the end of the chapter, the individual group statistics are consolidated to support some generalised statements on Roman siegecraft.

Chapter 1:

Roman Siegecraft: an overview

1. The Early History of Rome (Catalogue, nos. 1–37; Table 1)

1.1 Sources

Our main source of information on the siegecraft practised in the earliest period of Roman history is the historian Livy, writing in Augustan Rome. It is generally accepted that military details from Livy's first decade, which covers the period down to 293 B.C., will have little basis in fact. Briscoe, for one, believes that "the actual details of the majority of the battles are clearly invention, and indeed extremely stereotyped invention" (Briscoe 1971, 7), while Walsh has advised the reader to "ignore the great conflicts of the first decade, and the improbabilities involved there" (Walsh 1961, 160; cf. 197ff.). It is known that Livy utilised the original annalistic accounts (or earlier historians who had), so that, in writing of events three- or four-hundred years in the past, he at least had a basic framework. His contemporary, Dionysius of Halicarnassus, also writing at Rome, will have followed the same procedure (Gabba 1991, 85-90). But little in the way of written records seems to have survived the 390s (e.g., Ogilvie 1976, 16f.), inevitably casting doubt on catalogue entries 1-13 (see Appendix 1).

1.2 The Earliest Roman siegecraft: Commentary

The sample grouping of early Roman sieges, comprising those operations for which we have a reasonable level of detail, has thirty-seven entries spanning the years 510 to 293 B.C. (see Table 1, p. 16). One fact is immediately striking: even making allowance for

the uncertain cases of Sutrium (no. 14) and Milionia (no. 34), almost half of the operations took the form of a storming assault. At several, the method employed remains unknown, but ladders feature strongly in fourteen sieges: Cameria (no. 3), Corioli (no. 4), Antium (no. 5), Labici (no. 7), Anxur (no. 9), Satricum (no. 17), Sutrium (no. 18), Nepe (no. 19), Tusculum (no. 21), Privernum (no. 22), Satricum again (no. 23), Cales (no. 24), Romulea (no. 31), and Cominium (no. 36).

It is clear that some form of blockade was attempted, unsuccessfully, at Carventum (no. 8). The same strategy at Artena (no. 11) and Anxur (no. 12) was aided, on the one hand by treachery, and on the other by trickery. Falerii (no. 13) was apparently under blockade, when the attempted treachery of a school-master was famously rejected by the Roman commander, Camillus. Finally, the siege of Saticula (no. 27) spanned two seasons, during which the town was perhaps under continuous blockade.

The encircling earthworks of a circumvallation figure in six siege narratives: at Antium (no. 5), Fidenae (no. 6), Veii (no. 10), Anxur (no. 12), Falerii (no. 13), and Satricum (no. 17). A cordon of troops is mentioned in connection with Labici (no. 7), Satricum (no. 23), Cominium (no. 36), and perhaps also Nequinum (no. 29).

1.3 The Earliest Roman siegecraft: Discussion

Liebenam has criticised the accounts of early sieges as being unhistorically embellished (1909, 2236: “die Erzählungen sind unhistorisch ausgeschmückt”; cf. Veith 1928, 285: “Was die Quellen geben, ist ausschließlich Rekonstruktion”). He draws attention in particular to the reported presence of the battering-ram at Cameria in 502 B.C. (no. 3), Corioli in 493 B.C. (no. 4), and Antium in 459 B.C. (no. 5), and appeals to the testimony of Diodorus Siculus (12.28.3) as proof that the ram only made its début at Samos in 440 B.C. But even this date is not universally accepted. Neumann, for one, has condemned Diodorus and Ephorus for recording battering-rams prior to the Peloponnesian War (e.g., Plut., *Per.* 27.3, citing Ephorus as the authority; Neumann 1968, 872; 1972, 975: “fraglich”), although Garlan inclines towards giving Ephorus the benefit of the doubt (Garlan 1974, 133f.).

The real question is whether Dionysius is guilty of fabrication in his descriptions of the sieges at Cameria, Corioli and Antium. The fact that the battering-ram is absent from all of the other early siege operations is a powerful argument against its presence at these towns. Note, however, that we are not told the means by which the gates of Tusculum in 377 B.C. (no. 21) and Aquilonia in 293 B.C. (no. 35) were broken down.

Of course, there is nothing inherently unlikely about ramming operations at any date. Reduced to its basic form, the battering-ram is hardly a complex piece of machinery, and it is noteworthy that, on the two occasions when rams allegedly effected entry (*viz.*, at Cameria and Antium), it was by breaking the gates, not the walls. It is not inconceivable for an enterprising officer to have recognised the potential of a stout tree-trunk, carried by a squad of men and directed with force at a wooden gate. Nor is it inconceivable that the same stratagem was rediscovered by different men, in different places (e.g., Pericles at Samos; Archidamus at Plataea), and we must concede that, at Tusculum and Aquilonia, ramming the gates ought to be at least as likely as hacking them with axes and crowbars.

Liebenam is also suspicious of Livy's treatment of the siege of Veii (no. 10), where, in the third season (403 B.C.), the Romans reportedly deployed *turres*, *vineae*, *testudines*, "and the other apparatus for besieging a city" (Livy 5.5.6); these devices, as Liebenam says, were not yet known in Italy (Liebenam 1909, 2236). He could also have drawn attention to the improbability of the Romans tunnelling their way into the citadel. To be sure, the locality is noted for its honeycomb of drainage tunnels, and it may be that one of these was pressed into service by the Romans as a ready-made underground route into the town, but surely not up into the citadel. When a similar stratagem is claimed for the Romans in 435 B.C. at Fidenae (no. 6), Ogilvie notes that "it is only too likely that military details were used more than once to fill out a bare notice and that the taking of an Etruscan city by means of *cuniculus* was a story remembered more for the stratagem than the locality" (1965, 569 *ad* Livy 4.22.2; cf. *ibid.*, 570 *ad* Livy 4.22.4: "there are no visible traces of *cuniculi* as there are at Veii").

In fact, Ogilvie is sometimes overly critical, as when he denounces the use of fire by the

defenders of Pometia (no. 2) as “a conventional stratagem without any basis in fact” (1965, 278 *ad* Livy 2.17.2): the first point is true; the second must remain unproven. When Livy attributes the success of the Roman escalade at Anxur (no. 9) to the distraction of the defenders by a noisy feint, Ogilvie wearily diagnoses “a textbook stratagem advocated by Frontinus and employed by Pericles (3.9.5) and Antiochus at Ephesus (3.9.10)” (1965, 622 *ad* Livy 4.59.5). Of course, there can be no question of plagiarising an author who wrote a hundred years later, so Ogilvie’s intention must be to highlight a tactical cliché. However, the charge that a particular tactic cannot have been used because it was familiar enough to appear later in a book of stratagems is illogical. A similar criticism is levelled at the Artena (no. 11) operation, which Ogilvie characterises as “another textbook method of taking a city recommended by ancient strategists” (1965, 624 *ad* Livy 4.61.8). It is permissible to discount details on the basis of anachronism, as with the siege apparatus at Veii (no. 10) and Cales (no. 24), but not on the basis that they might be stock scenarios inserted to provide colour, and certainly not without arguing the case.

Of course, as Ogilvie succinctly states in connection with Livy’s first five books, “the fact that most of the flesh and blood of Livy’s narrative is fictitious should not lead one to doubt the bare bones” (Ogilvie 1971, 14; cf. Oakley 1997, 100). The question is: where does the flesh and blood end, and the bare bones begin?

1.4 The Earliest Roman siegecraft: Conclusion

From a straightforward reading of Livy, it appears that the favoured tactic in the early period was the storming assault with ladders. Of the thirty-seven sieges selected from this period, almost half (in fact, 49%, including two uncertain cases) record the taking of a town by storm; the next most common methods involve surrender (16%) or betrayal (14%) (see Table 1, p. 16). Scholars are content to accept this, because the relative simplicity of ladders appears well within the capabilities of the early Romans; any mentions of more sophisticated equipment can be excused as anachronisms introduced from the realities of Augustan warfare. It might legitimately be suggested that Livy’s annalistic source may well have preserved details of the method of assault, but we cannot be certain. Oakley has rightly stated, “No one has yet found a yardstick by which

truth and fiction in Livy may be securely distinguished, and probably no one ever will" (Oakley 1997, 100).

It would be inappropriate to compare the earliest Roman siegecraft with contemporary developments in the Greek world. For one thing, the fourth century saw the flourishing of mechanised siegecraft in Sicily, and its enthusiastic employment by the Macedonians and their successors in Greece and the Near East; this was clearly a dynamic period for Greek siegecraft, but it evidently bypassed Rome, to judge from her subsequent lack of sophistication (cf. §2, pp. 17ff.). It should not be forgotten that, at this early date, Rome was immersed in domestic affairs, and it was only with the arrival of Pyrrhus in 280 B.C. that she was brought into contact with the wider Mediterranean world.

A more accurate comparison may be made between the hoplite armies of fifth and fourth century Rome, and the Greek armies of the Peloponnesian War period. For this earliest period of Greek siegecraft, Garlan has identified a reluctance to commit to frontal assault, except where fortifications were weak or non-existent, or where the town lacked a garrison (Garlan 1974, 125-128, 147). Nevertheless, it must be admitted that the profile of early Roman siegecraft, as presented by Livy and Dionysius, is not like this at all. In fact, it is more reminiscent of the pattern displayed by the siegecraft of the Macedonian wars (§5, pp. 28ff.) or the early Empire (§12, pp. 60ff.), rather than the chronologically-proximate First Punic War period (§2, pp. 17ff.).

But if the Augustan historians have retrojected later tactics onto their treatment of fifth and fourth century events, perhaps, following a kind of domino effect, their tales of Rome's legendary past preserve vestiges of fifth and fourth century practice. Describing Romulus' war with Fidenae and Veii, Livy records two typical courses of events (Livy 1.14-15). At Fidenae, part of the Roman army lay concealed in dense undergrowth while their companions made a feint at the town gates; the enemy were drawn from the safety of their walls by the promise of an easy victory, and unwittingly fell into the ambush. As the Fidenates retreated in disorder, the Romans pursued them and burst through the gates at their heels. Ogilvie objects (1965, 81) that the battle is based on a conventional textbook trick found, for instance, in Frontinus (*Strat.* 2.5.1; cf. Polyaeus,

Strat. 8.3.2). The implication is that Livy has been guilty of fabrication. Of course, that is probably quite literally true, as we have acknowledged. But the fact that the trick is universally attributed to Romulus shows that there was a tradition to this effect, and equally that the ambush was a credible stratagem under these circumstances.

In contrast, the Veientes did not wait for the Roman arrival, but immediately took the field, we are told, to avoid being shut up in their town. However, the blistering Roman attack forced them to seek the shelter of their walls, whereupon Romulus laid waste to the countryside and departed. Again, Ogilvie draws attention (1965, 83) to the stratagem of preferring open battle to standing siege, citing Frontinus (*Strat.* 2.6; note that the chapter indicated by Ogilvie is actually on how a cornered enemy should be allowed to escape lest desperation give him the advantage).

These two stories serve to illustrate the paradox of primitive (that is, pre-mechanised) siegecraft, and may well preserve the bare bones of actual events. On the one hand, Romulus' capture of Fidenae is shown to have depended upon the opening of the gates by the townsfolk; similarly, he is powerless to take Veii once the townsfolk retreat within her walls. On the other hand, the Fidenates are easily tricked by the lure of certain victory to leave the security of their defences, and the Veientes are portrayed as wishing to avoid being caught within the town, as they would then be powerless in the sequel. It seems that neither the aggressor nor the defender enjoyed a particular advantage.

[illegible]

2. The First Punic War (Catalogue, nos. 38–44; Table 2)

2.1 Sources

Livy's account of the First Punic War is lost, but a certain amount of information can be gleaned from another of his contemporaries, the Greek historian, Diodorus Siculus, who drew upon the third century Sicilian writer, Philinus. There are also the early books of Cassius Dio's *Roman History*, written around A.D. 220, but which survive only as excerpts made by the Byzantine monk, Zonaras. However, the major source for this period is Polybius, whose *Histories*, written in the second century B.C., bring a solid reliability to the history of events from 264 B.C. down to the mid-second century.

2.2 Roman siegecraft during the First Punic War: Commentary

Although overwhelmingly a naval contest, the First Punic War nevertheless presents a small sample group of seven siege operations, for which we have a reasonable amount of information (see Table 2, p. 21). At only one of these, Lilybaeum (no. 44), did the Romans pursue a strategy of blockade, in the sense that the besieging army contained the defenders within a circumvallation and waited for their surrender. At one other site, Agrigentum (no. 38), and possibly also at Panormus (no. 42), the Romans constructed encircling fieldworks. At the former, the Roman blockading strategy failed when the distraction of a Carthaginian relieving force enabled the beleaguered garrison to slip out; whereas, at the latter, the action was played out along different lines. Nothing resembling a blockade was ever attempted at the four remaining sieges.

In its later stages, Lilybaeum presents a classic example of the blockade, but it began as a straightforward assault. Polybius records that two camps were established, one on either side of the town, hence to the north-east and south-east, as the whole western side faced the sea (Polyb. 1.42.8; cf. Diod. Sic. 24.1.1) (fig. 2). Interestingly, the camps were linked by a ditch, a palisade and a wall, presumably to safeguard the movement of Roman troops to and fro (cf. Caesar's lines at Gergovia, no. 133, fig. 12). The "works" (*erga*) which enabled the Romans to bring up battering-rams will have involved levelling the terrain and, in particular, filling the deep ditch which surrounded the town (Polyb. 1.42.7). Such levelling will have created a gentle *glacis* of some depth, which

the defenders perhaps attempted to destabilise from beneath, although Polybius uses the term “countermining” (Polyb. 1.42.12), which ought to imply measures taken to neutralise Roman mines. At any rate, after a year of fruitless assaults, the Romans changed tack, and the ditch and palisade were extended to surround the town (Polyb. 1.48.10), with the obvious exception of the western seaboard and its north-facing harbour.

By this stage, the Romans appear also to have established a successful naval blockade. Diodorus claims that an attempt had been made to block the harbour mouth with fifteen light vessels, loaded down with stones and presumably scuttled to present an obstacle; he further mentions stones, jetties and an anchored boom, which was destroyed in a storm (Diod. Sic. 24.1.1-2). Yet, despite the presence of the Roman fleet, the Carthaginians had been able to sail in and out of the harbour at will, during the whole of the first year (Polyb. 1.46.6-13; 47.3). It was only when the Romans finally managed to pile up a mound of some kind (Polyb. 1.47.5), on which blockade-runners were liable to run aground, that the relief expeditions appear to have ceased. Diodorus’s list of obstacles perhaps belongs here rather than earlier.

The siege was by no means a model of efficiency. By the end of 249 B.C., the Roman fleet was in ruins, and it was only the Carthaginian failure to press her advantage that allowed the Roman policy of passive siege at Lilybaeum to continue. It is unlikely that the town could have survived an eight-year blockade without relief, and the Carthaginians had probably resumed revictualling the town by sea, until the arrival of a new Roman fleet in 242 B.C. But even then, the town did not succumb, and the siege was only lifted when the war was won elsewhere.

At Agrigentum (no. 37), in the first major action of the war, the Romans built two camps, one to the west, the other probably to the south (see below, p. 87), and ringed the town with two lines of ditches, the inner of which guarded against sorties from within, the outer against a relieving force, while preventing the introduction of aid into the town; guard-posts were established in the resulting secure zone (Polyb. 1.18.2-4). After five months, the blockade seemed to be paying off, but the tables were turned when the Carthaginians seized the nearby Roman supply base and moved on the be-

siegers (Polyb. 1.18.6-10). Furthermore, an epidemic of some kind had broken out amongst the Romans (Polyb. 1.19.1), as may also have happened at the later siege of Lilybaeum (Diod. Sic. 24.1.4), and it was all they could do to maintain the blockade with minimal support from their ally, Hiero of Syracuse (Polyb. 1.18.11). Rather than waiting for the blockade to succeed, they eagerly accepted the offer of pitched battle and defeated the Carthaginians. In the event, the blockade itself was lax, as the Carthaginian garrison confined within the town was able to break out by night (Polyb. 1.19.12-13).

The alleged earthworks at Panormus (no. 42) are more problematic: it is Diodorus who mentions a ditch and palisade around the town (Diod. Sic. 23.18.4); by contrast, Polybius states that the Romans, "erecting works against two positions, and making other preparations, brought up the machines" (Polyb. 1.38.8-9). The operation was swift: a tower was knocked down and the town stormed. If there was a circumvallation around the town, it is odd that Polybius does not mention it, and it must be admitted that, in this particular case, a circumvallation does not tie in with the tactics adopted by the Romans.

Mytistratum (no. 39) and Aspis (no. 41) present cases of unopposed entry; Polybius claims that the former had been under siege for a while, but there is no mention of any investing works. Camarina (no. 40) and Lipara (no. 43), like Panormus, are straightforward assaults, the former through a breached wall. Of course, it should be borne in mind that Lilybaeum began as a failed assault; the Romans had spent a year throwing all manner of equipment at her walls.

2.3 Roman siegecraft during the First Punic War: Discussion

In his overview of the pre-Caesarian army, Veith has canvassed the opinion that Roman siegecraft of the period lacked the finer technical skills, having been denied any cross-fertilisation with Greek practice, and concentrated instead on the construction of field-works. For him, the efficiency of the Roman legion in all aspects of entrenching work brought the art of the blockade to its peak (Veith 1928, 373). He thereby begs two questions: first, that the Roman legion was already expert in field fortifications; and second, that the Romans developed blockading into a fine art.

On the first point, Veith accepts the testimony of Frontinus (*Strat.* 4.1.14; cf. Livy 35.14), that the Romans adopted the idea of the marching-camp from Pyrrhus in 275 B.C. (Veith 1928, 288), a theory which still divides scholars (e.g., Le Bohec 1989, 139, for; Keppie 1984, 38, against). (Incidentally, Pyrrhus is probably the third century foreigner to whom Richmond 1969, 194, alludes, rather than Polybius, as conjectured by Richmond's editors, and his text may be allowed to stand without being emended to "second century". Richmond may thus be counted amongst those opposing the above theory.) No-one would dispute that the Romans were competent field engineers prior to the outbreak of the First Punic War, but Veith implies that this competence was unusual in antiquity. There is no justification for this view; the Spartans of the Peloponnesian War period, for instance, were fully capable of building field fortifications, and Alexander's Macedonians regularly fortified their camps.

Veith further assumes, not only that the Romans surpassed all others in achieving results by blockading, but also that, acknowledging their superiority, they concentrated upon this form of siegecraft more than any other people in antiquity. Veith's assessment applies to the entire period of the so-called "Manipulartaktik", namely pre-Caesarian times; here, I examine its application to the middle years of the third century (cf. below, pp. 31, 36 & 45, for further discussion).

It is difficult to divine what Veith intends by his comment that the Romans conducted the blockade more successfully than any other ancient peoples. For example, he characterises Lilybaeum as "a purely land blockade of a sea-town, which necessarily remained quite incomplete" (Veith 1928, 374: "eine reine Landzernierung einer Seestadt, die demnach ganz unvollständig blieb"), but an instructive parallel may be drawn with the situation at Potidaea, another sea-town, in 432 B.C. There, the Athenians blockaded the town, half way along a narrow isthmus, by constructing a cross-wall on each side and keeping a watch on the coasts in between (Thuc. 1.64.1-3); the town held out until late in 430 B.C., when starvation forced its capitulation. The important point is that the blockade was complete, despite the maritime setting. Admittedly, an assault was attempted at one stage, in the vain hope of speeding the process, as the besiegers were succumbing to disease (Thuc. 2.58.1), but the Athenians were able to force a successful

conclusion in a little over two years. By contrast, the Romans made a poor showing at Lilybaeum.

2.4 Roman siegecraft during the First Punic War: Conclusion

Statistically, the sample grouping is too small to support definitive conclusions, but we may note that the storming assault appears to be at least as common a besieging tactic during this period as the blockade. In fact, of the seven sieges selected from this period, almost half (in fact, 43%) record the taking of a town by assault; blockade was attempted twice (29%) and sustained only once (14%).

	Agri-gentum	Myti-stratum	Camarina	Aspis	Panormus	Lipara	Lilybaeum		
	38	39	40	41	42	43	44		
investing works constructed	x				?		x	3	43%
cordon thrown around town								0	0%
assault ramp(s) constructed								0	0%
town blockaded	x						x	2	29%
siege abandoned								0	0%
town abandoned/undefended	x			x				2	29%
town surrendered		x					(x)	2	29%
town delivered by treachery								0	0%
mass suicide/last stand								0	0%
town carried by assault			x		x	x		3	43%
- wall breached			x		x			2	29%
- gate forced								0	0%
- escalade						?		1	14%
- unopposed entry	x	x		x				3	43%

Table 2: First Punic War

3. The Illyrian Wars (Catalogue, no. 45)

Polybius mentions three sieges mounted by the Illyrians along the Adriatic coast in 229 B.C. (Polyb. 2.9.7-10.8, Corcyra; 11.8-9, Epidamnus; 11.11, Issa) as a prelude to the so-called First Illyrian War, during which the Roman fleet apparently took several towns by assault (Polyb. 2.11.13), but these are omitted from the present discussion for lack of

detail. Ten years later, in the lightning strike known as the Second Illyrian War, the Romans captured the town of Dimallum (no. 45) in a seven-day operation. Although Polybius implies that siege-works (*erga*) of some kind were involved, the town was taken by assault.

4. The Second Punic War (Catalogue, nos. 46–53, 55–57, 59–64; Table 3)

4.1 Sources

Livy's narrative resumes with the Second Punic War, and is supplemented by Polybius's account, originally covering the period 220–146 B.C., but surviving only as fragments after 216 B.C. A third major source now emerges in the form of Appian, a writer who flourished under the emperor Antoninus Pius, but utilised earlier sources, including Polybius; the volumes of his *Roman History* dealing with Spain, Hannibalic Italy, and Carthage all contribute to an understanding of the siegecraft of this period.

4.2 Roman siegecraft in the Second Punic War: Commentary

We have details of seventeen Roman sieges during the Second Punic War (see Table 3, p. 27), and a sharp contrast with contemporary Carthaginian practice is immediately apparent: nowhere do the Romans dispose of the same range of siege machinery as the Carthaginians (cf. Hannibal at Saguntum: Appian, *Hisp.* 10–12; Livy 21.7.4–9.2, 11.3–15.2). Only in Scipio Africanus's siege of Utica (no. 64), and to a lesser extent in Cincius Alimentus's attempt on Locri (no. 56), do we catch a glimpse of the kind of mechanisation common in Carthaginian sieges.

Blockades were mounted at four towns, all of which surrendered: at Atanagrum (no. 46), the townsfolk, abandoned by their Carthaginian ally, Hasdrubal, capitulated within days; the Ausetani took thirty days to surrender (no. 47), perhaps trusting that the deep snow would discourage the Romans; the two-year blockade of pro-Carthaginian Capua (no. 53) ended in surrender; and, in the final stages of the siege of Syracuse (no. 50), when Marcellus settled down to blockade the walled Achradina quarter (fig. 3), the Syracusans capitulated.

Marcellus established three camps, with pickets in between, but the security of his blockade was never put to the test. Gnaeus Scipio perhaps threw a cordon around Atanagrum, as no investing works are mentioned, but he seems to have intended something more substantial against the Ausetani. At any rate, he had brought screens and shelters, probably implying an intention to undertake construction work, which was perhaps prevented by the deep snow. At Capua, two consuls and a praetor converged on the town, each establishing his camp in a different sector. Then, they dug a fairly sophisticated circumvallation. Livy refers to a double ditch and rampart, studded with guard-posts (25.22.16: *duplex fossa uallumque*; cf. 25.22.8: *fossa uallumque ... et castella*), but Appian gives a full description: “they dug a ditch round Capua ... and in addition to the ditch they built a wall in a circle round the whole place. Then the generals built another one outside the encircling wall, using the middle as a camp. There were battlements turned towards the besieged Capuans, and others towards those outside” (App., *Hann.* 37). The scheme is strikingly reminiscent of the Roman siege-works, fifty years earlier, at Agrigentum (no. 38), but the strategy paid off this time.

Surrender was achieved at a fifth town, Castax (or Castulo, no. 59), where the Carthaginian garrison refused to submit to Scipio Africanus’s deputy, Silanus; however, when Scipio arrived in person, fresh from the slaughter at Ilourgeia (no. 60), the townsfolk suddenly found the incentive to overpower their erstwhile overlords and hand the town over to the Romans.

Scipio Africanus perhaps initially attempted a blockade at Locha (no. 63), to judge from Appian’s comment that the siege had been long, but the town was taken by assault. An assaulting strategy was adopted at Locri (no. 56), for which the Romans requisitioned equipment from Sicily (see below, p. 163) and constructed siege-works (*opera*) of some sort, but quickly abandoned them at the news of Hannibal’s approach.

At Orongis (no. 57), Scipio Asiaticus began by constructing a double ditch and rampart around the town, but proceeded to launch waves of escalating assaults, and finally hacked the gates open. Since he originally hoped to win the town over by diplomacy, the circumvallation may have been a psychological device, designed to encourage the

townsfolk's capitulation; this is the first indication that siege-works might have more than purely practical significance. If the *opera* which Livy mentions at Locri (no. 56) were entrenchments, they were perhaps designed more to safeguard the besiegers than to hem in the besieged, as Cincius's strategy was based squarely on assault; but Livy's use of the word is problematic, often implying no more than siege-equipment (see below, pp. 97f.).

When Marcellus brought up equipment, including shelters, at Casilinum (no. 48), the inhabitants began to leave the town, seeking the protection of Marcellus's consular colleague, Maximus. Many of the townsfolk were killed in the ensuing disorder, and the Romans easily re-occupied the town, but it seems that Marcellus had been prepared for entrenching work. Equally, the mere sight of the equipment was enough to persuade the inhabitants to flee.

Besides Orongis, another seven towns were carried by assault, in four cases via the gates, in three cases by scaling the walls. At Leontini (no. 49), the gates were stormed from the outside, but at the other three, they were opened from the inside, following a successful escalade. At Arpi (no. 51), a heavy downpour drowned the noise of the assault and kept the guards under cover, where they could not interfere. At Cartagena (no. 55; fig. 4), by some oversight, many of the ladders were too short, and the resulting confusion gave the Carthaginians time to organise a defence, but, in the meantime, a less well-defended sector was identified and successfully scaled, and the gates were broken open from within. Events took a similar course at Syracuse (no. 50) in the second year of the siege: after all attempts at frontal assault had been frustrated by the engineering skill of Archimedes (Livy 24.34.16), Marcellus finally took the town by nocturnal escalade during a local festival (Livy 25.24.2), and the storming party then broke open the gates from inside to admit the army. As we have seen, this was not the end of the affair, for Marcellus still had to deal with the walled Achradina sector around the harbour.

Mass escalade was employed at Ilourgeia (no. 60), where Scipio Africanus was obliged to embolden his troops by threatening to mount the ladders himself; if this was simply a cunning stratagem, Scipio's bluff was not called, and he was spared the same fate as

Alexander in the town of the Mallians (Arrian, *Anab. Alex.* 6.9.3-6; Curtius, *Hist. Alex.* 9.4.30-33; Plut., *Alex.* 63.3). Scaling parties were sent forward at Locha (no. 63), apparently as a last resort, but the prospect of an escalade prompted the townsfolk to surrender; unfortunately, the frustrated soldiers chose to disregard Scipio's order to desist, but their insubordination did not go unpunished. At Locri (no. 62), the Romans gained access via ladders let down by sympathetic townsfolk, but the subsequent assault on the citadel required the assistance of craftsmen, who had worked there, to manufacture ladders of the correct length.

Finally, the siege of Utica (no. 64; fig. 5) saw a forty-day assault by land and sea, but ended inconclusively when the Romans withdrew to winter quarters. In the following year, Scipio maintained the pretence of a blockade, but the main theatre of war had moved elsewhere and there was no longer the requirement to capture the town. Scipio is said to have employed artillery and machinery, partly requisitioned from Sicily and thus, like the machines deployed by Cincius Alimentus at Locri (no. 56), arguably Carthaginian in origin. Livy says that the latter included "machines with which they were shaking the walls" (27.28.17), which implies battering-rams, and Scipio's machinery at Utica likewise included rams (Appian, *Pun.* 16). In something of an innovation, if only for Roman siegecraft (see below, pp. 132ff.), he constructed an embankment to carry the rams up to the wall.

4.3 Roman siegecraft in the Second Punic War: Discussion

Syracuse stands out amongst Rome's adversaries in the Second Punic War for the diversity and sophistication of its defences. The Romans based their strategy on the frontal assault, against the sea wall using the mechanical scaling-ladders known as *sambucæ* mounted on shipboard (Polyb. 8.4.1-11), and against the land wall with ladders and wicker screens (Polyb. 8.3.6). Veith is quite correct in his assessment that the Romans were completely outclassed by the engineering skill of Archimedes, but his appeal to "the towering superiority of Greek fortification" (Veith 1928, 375: "die turmhohe Überlegenheit der griechischen Festungskriegskunst") is misguided: generalising from this one town ignores its uniqueness and belittles the genius of Archimedes. Much the same attitude is adopted by Connolly, who uses the siege as an illustration of "the Romans'

rather unsuccessful attempts at scientific warfare” (1981, 294). Liebenam oversimplifies in a different way; for him, Syracuse simply illustrates the general difficulties of besieging a coastal town (Liebenam 1909, 2248: “Besondere Schwierigkeiten brachte die Belagerung der am Meere gelegenen Städte”).

The implication underlying Veith’s (and, to a lesser extent, Connolly’s) damning critique is that Roman methods were at fault, and Syracuse would easily have fallen to Greek siegecraft. However, on the landward side, the steep approach to the walls would have made the use of heavy machinery difficult, particularly when faced with Archimedes’ artillery, arranged on several levels and firing on different trajectories. And the unsuccessful naval assault is strikingly reminiscent of Demetrius’s siege of Rhodes in 305-304 B.C., where repeated ship-borne assaults supported by saturation artillery bombardment failed to secure the harbour (cf. Droysen 1909, 2230-2234). Third century Syracuse was perceived as the epitome of impregnability, far more so than fourth-century Rhodes; if the eponymous “Besieger” was unable to capture the latter, it can only be to Marcellus’ credit that he eventually managed to capture the former.

Roman efforts in this period are also belittled by Goldsworthy, who maintains that, “if the Romans failed to take a fortified city by surprise assault or treachery, they were not skilled at prosecuting a formal siege and usually had to rely on starving the enemy into submission” (2000, 49). His assessment, that Roman armies of the middle Republic were unskilled in formal siegecraft, must be based on the evidence of Scipio’s performance at Utica, because that was the only occasion, throughout the Second Punic War, on which a Roman army attempted a Hellenistic-style mechanised siege (though we have seen that Cincius Alimentus may well have intended this at Locri). In that respect, Goldsworthy’s criticism is unfair. But his implication that the preferred methods were *coup de main* and treachery does not stand up to scrutiny, either.

The assault on Leontini (no. 49) was sudden, and the assault on Arpi (no. 51) was launched under cover of dark, but none of the remaining six assaults depended upon the element of surprise. The case for treachery fares even worse, for only one of our sample grouping of seventeen sieges relied upon betrayal (Tarentum, no. 52). Finally, Golds-

worthy's claim that, when all else failed, Roman armies of the period resorted to passive blockade, does not accurately reflect the evidence, either. At the four sites from this period where a policy of blockade was pursued, it seems that the strategy was deliberately selected, not fallen back upon.

In the final analysis, it appears that the besieging method preferred by Roman armies during the Second Punic War was the storming assault, usually by escalade, often accompanied by forcing open the gates.

	Alanagrum	Ausetani	Casilinum	Leontini	Syracuse	Arpi	Tarentum	Capua	Cartagena	Locri	Orongis	Castax/Castulo	Ilourgeia	Astapa	Locri	Locha	Utica		
	46	47	48	49	50	51	52	53	55	56	57	59	60	61	62	63	64		
investing works constructed								x			x							2	12%
cordon thrown around town																		0	0%
assault ramp(s) constructed																	x	1	6%
town blockaded	x	x			x			x										4	24%
siege abandoned										x							x	2	12%
town abandoned																		0	0%
town surrendered	x	x			(x)			x				x				x		5	29%
town delivered by treachery							x											1	6%
mass suicide														x				1	6%
town stormed			x	x	x	x			x		x		x		x	(x)		8	47%
- wall breached																		0	0%
- gate forced				x	x	x			x		x							5	29%
- escalade					x	x	x		x		x		x		x	x		8	47%
- open gate			x				x											2	12%

Table 3: Second Punic War

4.4 Roman siegecraft in the Second Punic War: Conclusion

In summary, out of seventeen Roman sieges, four were conceived as blockades (including the siege of Achradina at Syracuse), all of which resulted in a surrender (24%). Eight (including the capture of Epipolae at Syracuse) represent towns taken by assault (47%); nine (53%), with the inclusion of Astapa (no. 61), where the townsfolk chose suicide over the continued defence of their town; and ten (59%), with the inclusion of Casilinum (no. 48), where the townsfolk did not oppose the Roman assault. In only two cases (12%) was a siege abandoned before completion, and in only one case (6%) was treachery the deciding factor.

5. The Macedonian Wars (Catalogue, nos. 54, 58, 65–83, 88–90; Table 4)

5.1 Sources

When we turn to Roman involvement in Greece and the Balkans, the surviving fragments of Appian's *Macedonica* present no siege narratives, so our main sources are, again, Polybius and Livy; some details preserved by Zonaras from the early books of Cassius Dio are also pertinent.

5.2 Roman siegecraft during the Macedonian Wars: Commentary

We have details of only two Roman sieges from the First Macedonian War (nos. 54 & 58), but the profusion of Second Macedonian War sieges yields eleven detailed examples (nos. 65–75), to which may be added two (nos. 76–77) properly belonging to the war of 195 B.C. with Sparta, five (nos. 78–81 & 83) from the Aetolian War of 191–189 B.C., and three from the Third Macedonian War (nos. 88–90). A single example (no. 82), strictly relating to the war with Antiochus III, has been included here, also, on the grounds of contemporaneity (see Table 4, p. 33).

The emphasis is very much on the storming attack, or the threat of the storming attack. Anticyra (no. 54) was intimidated into surrender by overwhelming force; artillery first appears in Roman hands here (see below, p. 163), and the Greeks were perhaps all too familiar with its effects. Celetrum (no. 66) surrendered at the approach of a legionary *testudo*; Andros (no. 67) and Carystus (no. 69), too, surrendered at the unfamiliar sight of Roman troops. At Gytheum (no. 76), the townsfolk surrendered when the walls were breached, and at Sparta (no. 77), where a cordon was thrown around the town, the incessant harassing attacks of the Romans against the unwallled sectors persuaded the inhabitants to surrender.

Besides Gytheum (no. 76), several other sieges feature the breaching of walls by battering-ram. A long-drawn operation at Oreus (no. 68) was brought to an end when troops stormed through a breached wall, but at Corinth (no. 73), although a section of wall was demolished, the besiegers withdrew at the rumour of Macedonian reinforcements. At Leucas (no. 75), Heraclea (no. 78) and Haliartus (no. 88), wall breaches were

repaired before they could be exploited, and a storming assault through a wall breach at Atrax (no. 71) was repulsed. Similar assaults at Elatea (no. 74) and Phocaea (no. 82) were coordinated with escalades elsewhere around the circuit; Elatea was captured and sacked, but Phocaea surrendered to avoid a similar fate. When the defenders at Haliartus (no. 88; fig. 6) repaired their breached wall, Lucretius Gallus resorted to escalade around half of the town. The breach made at Eretria (no. 70) does not seem to have been repaired, but the townsfolk maintained an effective defence until they finally succumbed to a nocturnal escalade.

Ladders could be an effective means of assault in their own right. Chalcis (no. 65), Heraclea (no. 78) and Lamia (no. 80) were captured in dawn escalades, Lamia at the second attempt, and the troops attacking Heracleum (no. 89) adopted the unusual expedient of clambering onto the walls from the top of a *testudo* shield-formation. Of course, under the right circumstances, using the gate was more convenient: when a force sortied out of Daulis (no. 72), Roman troops repulsed them and stormed through the open gate at their heels.

Several sites exhibit the kind of full-blown operation hitherto restricted to Carthaginian and Macedonian armies. When Flaminius's storming assault at Atrax (no. 71) was repulsed, an embankment (*agger*) was constructed for the advance of a siege-tower, a device which appears in the Roman arsenal for the first time here; its utter failure can be put down to Roman unfamiliarity with this type of assault. Later in the same year, Flaminius again built embankments for his attack on Corinth (no. 73), but, fearing the arrival of enemy reinforcements, he ordered all of the siege-works (*opera*) to be burned and made an orderly withdrawal. Several years later, Acilius Glabrio's assault on Heraclea (no. 78) involved the construction of embankments (*aggeres*) for the advance of battering-rams, but when the townsfolk burned the Roman equipment, Acilius resorted to escalade.

In the same year, he appears to have blockaded Naupactus (no. 79) by surrounding the town, perhaps with a ring of pickets, such as are mentioned at Amphissa (no. 81). The troops surrounding Haliartus in 171 B.C. (no. 88) were perhaps distributed as pickets,

also. There is no mention of earthworks at Naupactus, but there must have been frequent assaults, as the town was said to be “near to destruction” after two months; it was this that persuaded the garrison to surrender. The siege of Amphissa was raised when the Aetolians agreed to a truce.

Flaminius appears to have launched a major operation at Leucas (no. 75), with undermining and ramming, but he made no headway, until a sympathetic faction within the town gave him access. Treachery was also instrumental in the taking of Oreus (no. 58), where the Macedonian garrison was expelled with the compliance of its commander.

Siege-works of some kind are mentioned in the second siege of Oreus (no. 68), and perhaps at Eretria (no. 70), Haliartus (no. 88), and Meliboea (no. 90), although the word *opera* is ambiguous (see further below, pp. 97f.) and perhaps simply refers to equipment at the last three; ultimately, Oreus, Eretria and Haliartus were carried by assault, while operations at Meliboea were abandoned. One siege that definitely involved earthworks was at Ambracia (no. 83; fig. 7), where Fulvius Nobilior linked his three camps (Livy calls one of them a *castellum*) with a rampart and ditch. Attacks at five different sectors were vigorously repulsed, so, in a change of tack, the Romans began tunnelling, perhaps attempting a technique which they must have seen their erstwhile Macedonian allies using (e.g., at Lamia, two years earlier, while the Romans were besieging neighbouring Heraclea: Livy 36.25.1-2). However, not realising the importance of concealing the excavated spoil, they unwittingly alerted the Ambracians, who were then able to take counter-measures. The siege was only raised when the Ambracians were persuaded to surrender.

Again, it is pertinent to ask why a circumvallation was dug, probably at Oreus, definitely at Ambracia, if the strategy was one of assault. The solution would seem to be two-fold: the visual confirmation of the besiegers’ resolve to press the assault, with the consequent psychological pressure on the besieged; and the securing of the besiegers’ position, with the attendant boost of confidence for the attackers. Much the same psychological effect, but with a reduced practical benefit, would be achieved by establishing a cordon of troops, such as we see at Sparta and Lamia. Visual confirmation that

the place was surrounded, and that there could be no escape, simply underlined the hopeless position of the besieged.

It is interesting to note that the artillery with the allied fleet at Eretria (no. 70) and Leucas (no. 75) was probably supplied by Rhodes and Pergamum; only the Pergamene contingent had artillery at Oreus (no. 68). The artillery that featured in Fulvius Nobilior's triumph in 187 B.C. (Livy 39.5.16) will have been seized from Ambracia (no. 83) (below, p. 163).

5.3 Roman siegecraft during the Macedonian Wars: Discussion

For this period, too, Veith's characterisation of Roman siegecraft in the Polybian era as the art of blockade (1928, 373) is at fault. He considers the *coup de main* to have been rare (1928, 374: "die primitive Form des Handstreiches ist selten"; cf. 446), which is correct, if by this he means the surprise escalade at dawn; this tactic accounts for only four of the sieges in our sample group (17%). However, in quoting Nobilior's long drawn-out siege of Ambracia as a typical Roman besieging assault, and drawing the conclusion that the Romans avoided this type of operation (1928, 375), he commits a grave error. Likewise, his assertion that machinery was only used in a subordinate role (1928, 374) goes against the evidence, for the Romans used battering-rams, in this period, at more than one siege in three.

Connolly has put a slightly different emphasis on the same argument. In an essay treating the Roman army of the period from 200 B.C. down to 120 B.C. (and thus of relevance to §6, also), he states that, "if they were unable to storm the walls, the Romans preferred to blockade a town" (Connolly 1989, 168). Few modern writers have dealt with the subject, and the tendency to follow where Connolly leads is compelling (e.g., Goldsworthy 2000, 145). But there are sufficient examples of the breaching of walls to demonstrate that the blockade came a poor third in the ranking of siege techniques; indeed, the blockade is virtually absent from the period of the Macedonian wars. If the Roman sieges of this period were to be characterised by the dominant method of capture, it would be the escalade.

Another persistent notion is that, once operations were begun, the Romans persevered doggedly. Connolly, for instance, has written, in a discussion of Roman circumvallation, that “because [the Romans] never gave up a siege once it had been started, the besieged knew that they stood no chance of winning and were usually quick to submit” (Connolly 1981, 293; followed by Gilliver 1999, 160). His argument is based on a false premise, as fully one in eight of the sieges from the period of the Macedonian wars was abandoned before completion. His conclusion regarding speedy surrender is equally difficult to substantiate. Certainly, nine of our twenty-four sieges (ten, including Amphissa) ended in surrender, four of them before the Romans had even approached the walls, but it is apparent that the townsfolk were intimidated, not by the horror of a lengthy blockade, but by the ferocity of a legionary attack.

5.4 Roman siegecraft during the Macedonian Wars: Conclusion

In summary, of the twenty-four Roman sieges, none can strictly be characterised as a blockade in the sitting-and-waiting sense: there is one clear case of a circumvallation and another probable case (8%), though continuous assaults were actively pursued at both. In two cases, a cordon of troops surrounded the town in preparation for an assault; in another three cases, pickets were probably established around the town, again in conjunction with assault operations. Embankments were raised for three sieges (13%), two of which were abandoned; only one other siege was abandoned (13%). In ten cases, the walls were breached by battering-rams, though in only five of these was capture effected by an assault through the breach, four of them in combination with escalade; two led to surrender, two were abandoned, and one was taken by other means. Fully ten towns surrendered (including the special case of Amphissa, which ended in a truce: 42%), four of them before the assault had even begun, and two were delivered by treachery (8%). The remaining nine towns were stormed (38%), all but one by escalade. (See Table 4, p. 33.)

[illegible]

6. The Spanish Wars (Catalogue, nos. 84–87, 91–94, 97–102; Table 5)

6.1 Sources

Following the defeat of the Carthaginians in Spain, the Romans continued to maintain a military presence in the peninsula, but the sources are notoriously short on dates and topographical detail. M. Porcius Cato allegedly captured four hundred Spanish towns in 195 B.C. (Plutarch, *Cato Maior* 10.3; Frontinus, *Strat.* 3.1.2, relates to this campaign); in 193 B.C., C. Flaminius captured the Oretanian town of Inlucia (Livy 35.7.7); and in 181 B.C., the besieged town of Contrebia surrendered to Q. Fulvius Flaccus, who proceeded to capture many strongholds in Celtiberia (Livy 40.33.9: *multa castella*). Unfortunately, we have no detailed narrative of these.

6.2 Roman Siegecraft during the Spanish Wars: Commentary

Besides the Celtiberian and Lusitanian operations down to the capture of Numantia in 133 B.C., the bounds of geography have been stretched to permit the inclusion of contemporary operations outwith Spain: the siege of Nesactium (no. 87) properly belongs to the war of 178/177 B.C. in the Istrian peninsula, and the siege of Delminium (no. 91) occurred during a punitive expedition in Illyria in 155 B.C. (Table 5, p. 40).

At Certima (no. 85) and Alce (no. 86), Sempronius Gracchus employed siege-works (*opera*), by which Livy probably means machinery rather than entrenchments in at least one of the two cases (Livy 40.47.3: *opera admoveret*; see below, p. 98). Claudius Marcellus is said to have constructed embankments (*chōmata*) at Nertobriga (no. 92), probably to enable the advance of the “machinery” (*mēchanēmata*) mentioned by Apian, which, in this context, must surely be battering-rams. This was certainly the purpose of the embankments (*chōmata*) at Intercatia (no. 94). The townsfolk there eventually succumbed to starvation, and the towns of Certima, Alce and Nertobriga all surrendered, but Aemilius Lepidus was not so fortunate at Pallantia (no. 101); frustrated in his attempts to break in with machines (*mēchanai*), he finally abandoned his equipment and withdrew. Metellus, too, failed to break into Centobriga (no. 97), when he fell victim to compassion for the children whom the defenders had positioned in the path of his battering-ram. Only at Munda (no. 84) and Lagni (no. 100) do we hear of genuine storm-

ing assaults, and the surrender of Cauca (no. 93) was achieved after a skirmish outside the town.

The town of Nesactium (no. 87) was surrounded by troops, perhaps distributed as pickets, since Livy does not mention a cordon; when the starving townsfolk resorted to self-slaughter, the Romans were able to mount an unopposed escalade. The year-long blockade of Delminium (no. 91) was probably maintained by pickets, while Marcius Figulus targeted the surrounding strongholds; no earthworks are mentioned, and the hilly location prevented the use of machinery. A cordon was definitely thrown around the town of Intercatia (no. 94), while Lucullus built embankments for bringing up battering-rams, but his troops began to suffer from dysentery, a frequent bugbear of long-term blockading operations (cf. Agrigentum, no. 38; Lilybaeum, no. 44; Carthage, no. 95; Numantia, no. 98; Pallantia, no. 101; Dyrrachium, no. 143); in the event, the Intercatians repaired their breached wall, but surrendered from starvation. At Numantia, after two failed attempts (nos. 98-99), the town was ringed by a stone wall connecting seven camps, and starved into surrender (no. 102).

6.3 Roman Siegecraft during the Spanish Wars: Discussion

Clearly, in siegecraft, the site dictated the means, and it is noteworthy that the Celtic towns of the period appear to have been less vulnerable to the storming assault than the Greek towns of the Macedonian and Punic wars. This may, in part, be due to the difficulties of capturing a hill-top site; certainly, this was the complaint of the author of the *Bellum Hispaniense*, that “the nature of the place so prevented besieging assaults that Spanish towns were not easily captured by an enemy” (*Bell. Hisp.* 8). The inhabitants were, however, intimidated by siege machinery.

The classic siege of the period is, of course, Scipio Aemilianus’ blockade of Numantia (no. 102; fig. 9), which has always excited interest on account of Appian’s full description of the siege-works, and the surviving archaeological remains. Veith holds it up as the exemplar (1928, 374: “Das Paradigma der Zernierungen dieser Zeit”), and his opinion is evidently shared by Connolly, who has stated that “Numantia was a typical Ro-

man siege" (1989, 168). This is demonstrably untrue: in no respect can it be taken as representative, either of sieges of this period, or of Roman sieges in general.

In fact, far from exemplifying a routine strategy, Scipio's siege of Numantia stands out as an anomaly, which prompts the question, why this strategy at this site? It is a crucial factor that the Numantines had already frustrated two Roman attempts on their town (nos. 98-99), and Scipio was perhaps anxious to avoid repeating previous mistakes. He was allegedly disapproving of generals who risked lives unnecessarily (Appian, *Hisp.* 87); but, far from championing the blockade as the besieging technique *par excellence*, he may have settled on the strategy after having attempted a frontal assault himself (reading between the lines of Frontinus, *Strat.* 2.8.7; 4.1.1). Schulten, the excavator of Numantia, recognised that the blockade was by no means the only strategy open to the Romans here (1927, 11), but Pompeius had already attempted the storming assault (no. 98) to no avail, and Popilius Laenas had tried escalade (no. 99), so the blockade was, in effect, a last resort.

The blockade theories of Veith and Connolly fare no better for this period, than for the period of the Macedonian wars (above, p. 31). In what is surely an oversight, Connolly (1981, 293) lists Numantia along with Lilybaeum, Capua and Alesia, as examples of "bicircumvallation", a word coined to describe the technique of encircling a town with two lines of fortifications, one facing inwards, the other facing outwards. Lilybaeum is presumably a slip for Agrigentum, which he mentions earlier in the passage, but there was never more than one line of encirclement at Numantia.

More seriously, Connolly states that "bicircumvallation became the standard Roman system" (1981, 293; followed, e.g., by Peddie 1994, 126; cf. Fuller 1965, 96), but we have seen that, for the Spanish wars at any rate, the battering assault was most commonly used. This, in turn, contradicts Connolly's subsequent statement, that "the Romans only adopted Hellenistic machinery when they were operating with Greek allies ... but they made little effort to understand or develop these techniques" (Connolly 1981, 294). Curiously, he highlights "the building of ramps" as a Roman preference, but, in the first place, embankments were still infrequently used by Roman commanders

in the second century, appearing only twice in the period of the Spanish wars (15% of our sample group) and three times in the period of the Macedonian wars (13% of our sample group); and in the second place, they were invariably used at this time to facilitate the advance of machinery, particularly the battering-ram, which Connolly under-rates as a Roman weapon.

6.4 Roman Siegecraft during the Spanish Wars: Conclusion

The fourteen sieges of this section may be summarised as follows: two towns were stormed in a *coup de main*, and two were stormed after blockades of unspecified length (total: 29%); six surrendered (43%), one after defeat outside the town, three after witnessing the arrival of siege machinery, and two as a result of starvation; and four sieges failed (29%) (see Table 5, p. 40). Only one town, Numantia, was subjected to a purely blockading strategy (representing 7% of the sample group), and this is the only site where a circumvallation was constructed, although three other towns were surrounded by troops, probably distributed as pickets. Machinery was present at six towns, but only two of them saw the construction of siege-embankments; four of these ended in surrender, and operations were abandoned at the other two.

7. The Third Punic War (Catalogue, nos. 95–96; Table 5)

7.1 Sources

The historian, Appian, mentions several sieges from the Third Punic War (e.g., *Pun.* 110, Aspis; *Pun.* 126, Nephesis), but preserves a detailed narrative of only two: Carthage itself (no. 95), and Hippagreta (no. 96). No other ancient authority mentions the siegecraft of the period.

7.2 Roman Siegecraft during the Third Punic War: Commentary

At Hippagreta (no. 96), the Roman commander, Calpurnius Piso, launched several attempts on the town, but the inhabitants persisted in burning his machinery, until he abandoned the attempt. At Carthage (no. 95; fig. 8), however, operations dragged on for four seasons. In 149 B.C., an attempted escalade was repulsed, so machinery was constructed; but, when the wall was breached, the townsfolk were able to repair it and

even burned the Roman equipment. Sickness broke out in one of the two Roman camps, and the Carthaginians continued to mount sorties against the other camp. The following year saw no action at Carthage, and it was late in 147 B.C. that Scipio Aemilianus, the future conqueror of Numantia, arrived. Shortly beforehand, the Romans had launched an escalade at a poorly guarded sector of the wall, along the coast to the north; although they were discovered, they managed to rout a Carthaginian force which had sallied out in response, and burst into the city's Megara quarter at their heels; trapped inside, they had to be extricated by Scipio next day.

Scipio now put the hitherto haphazard operation onto a new footing by confining the Carthaginians within their walls and isolating the city with a double ditch and wall across the isthmus (see below, p. 100). He then tightened the naval blockade by sealing the harbour with a mole, and, although the Carthaginians opened a new entrance to their harbour, the Romans defeated her fleet and seized the quay. The final assault was delayed until 146 B.C., when Scipio's troops broke into the city from the harbour.

7.3 Roman Siegecraft during the Third Punic War: Discussion

Piso's attempt on Hippagreta (no. 96) falls comfortably into the category of mechanised sieges familiar from the Spanish wars, but it is the sequence of events during the first season at Carthage (no. 95) that is most revealing. Manilius and Censorinus assumed that the city could be taken in a *coup de main* by escalade, and when that failed they fell back upon a mechanised battering attack; when that also failed, the siege deteriorated into apathy. It was left to Scipio to bring the operation into line. The parallel with Numantia is striking, with the failed assaults of Manilius and Censorinus matching Pompeius' and Popillius' misjudged attacks on the Spanish town (nos. 98-99). Scipio's strategy at Carthage is also interesting in the light of his later treatment of Numantia (no. 102). Troops were inserted into the city in a nocturnal escalade, perhaps as a probing attack; we have seen that he may well have done the same thing at Numantia. However, Veith is mistaken to categorise Carthage purely as a blockade (1928, 373: "rein Zernierung"). Like Numantia, it was certainly isolated by entrenchments, a rather more difficult proposition in a maritime location, but Scipio's objective was always the

storming assault. Perhaps if the Numantines had not surrendered, they would have been subjected to a final assault like the Carthaginians.

In passing, we may note that the punishment, whereby a captured town was “destroyed and ploughed into the ground, and salt was sown so as to make the ground uncultivable”, which Connolly attributes to Carthage, Numantia and Jerusalem (Connolly 1981, 295), was only ever claimed for the first of these towns, and has now been revealed as a fiction (Ridley 1986, 143-144).

7.4 Roman Siegecraft during the Third Punic War: Conclusion

The sample grouping for this period is too small for formal conclusions. However, when added to the fourteen broadly contemporary sieges of the Spanish Wars (see Table 5, p. 40), Carthage joins Nesactium and Delminium as towns that were stormed after a temporary blockade, and the number of successful assaults rises to five out of sixteen (31% of the increased sample). Carthage also increases the number of circumvallations to two out of sixteen (13%), while the addition of Hippagreta increases the number of abandoned sieges to five out of sixteen (31%).

[illegible]

8. The Jugurthine War (Catalogue, nos. 103–108; Table 6)

8.1 Sources

Polybius's account never extended beyond 146 B.C., and Livy's narrative runs out in 167 B.C., although the so-called *Periochae* ("contents") continue down to Augustan times. As a source of detailed siege narratives, however, we have the work of Sallust, a historian writing shortly after the death of Julius Caesar. His *Bellum Iugurthinum*, covering the war of 112-105 B.C. in Numidia, provides six examples of Roman sieges (see Table 6, p. 42).

8.2 Roman Siegecraft during the Jugurthine War: Commentary

At Thala (no. 106), Caecilius Metellus surrounded the town with a ditch and palisade, and proceeded to throw up embankments (*aggeres*) at two locations, presumably for the advance of the battering-rams which he subsequently directed at the walls. Sallust says that a tower was erected on each embankment (Sallust, *Iug.* 76.3), to safeguard the siege-works (*opus*), no doubt by enabling covering fire to clear the battlements of defenders. When the wall was finally breached, the Roman entry was greeted by mass suicide and the destruction of valuables.

Earlier, Metellus surrounded the town of Zama (no. 104), though probably with pickets of troops, as there is no mention of earthworks. The town of Suthul (no. 103), on the other hand, was surrounded by marshes, so Postumius Albinus built an embankment (*agger*), no doubt to serve as a dry causeway; strangely, he does not appear to have had machinery, but perhaps there had been no time for its construction before Jugurtha turned the tables on him. By contrast, Marius arrived at the fort on the Muluccha River (no. 108) with a full siege-train, but the inaccessibility of the site, channelling traffic along a single, narrow approach, frustrated any attempts at frontal assault, until a diversionary attack threw the defenders into disarray.

The Romans easily captured the towns of Vaga (no. 105) and Capsa (no. 107) by *coup de main*. The former was taken without resistance, when the attackers were mistaken for allies, and the latter was left undefended, relying upon its remote location to deter

any attack. In both cases, the Romans travelled light, which implies that a storming assault was intended. At Zama (no. 104), after surrounding the town, the Romans attempted simultaneously to undermine and to scale the walls, but were obliged to withdraw in the face of ferocious defence. The siege of Suthul (no. 103) was also abandoned, after Jugurtha subverted some of the Roman allies, whose treachery compromised the security of the Roman camp.

8.3 Roman Siegecraft during the Jugurthine War: Discussion

There is no modern discussion of siegecraft during the Jugurthine War, although it falls into Veith’s pre-Caesarian period (1928, 373-375). It is perhaps sufficient to note that the sole example of a circumvallation, the ditch and palisade at Thala (no. 106), was accompanied by embankments and a mechanised assault. There is no sign of a blockading strategy in any of the Roman operations.

	Suthul	Zama	Vaga	Thala	Capsa	Muluccha		
	103	104	105	106	107	108		
investing works constructed				x			1	17%
cordon thrown around town		?					1	17%
assault ramp(s) constructed	x			x			2	33%
blockading strategy							0	0%
siege abandoned	x	x					2	33%
town abandoned							0	0%
town surrendered							0	0%
town delivered by treachery							0	0%
mass suicide							0	0%
town stormed			x	x	x	x	4	67%
- wall breached				x			1	17%
- gate forced						(x)	1	17%
- escalade							0	0%
- open gate			x		x	x	3	50%
- wall crossed							0	0%
- wall undermined		x					1	17%

Table 6: Jugurthine War

8.4 Siegecraft during the Jugurthine War: Conclusion

Throughout the Jugurthine War, the dominant Roman strategy was the assault (see Table 6, p. 42); the only hint of a blockade is Jugurtha's siege of Cirta (Sall., *Jug.* 21.3-26.3). In one case, a full-blown mechanised operation culminated in a wall-breach (Thala, representing 17% of our sample group), but in the other three successful assaults the Romans stormed an undefended gateway (50%). A major assault was perhaps planned at Suthul; an embankment was erected there, and at Thala (33%). Two sieges were abandoned (33%), representing a similar proportion to the preceding period (cf. Table 5, p. 40).

9. From Sulla to Pompey (Catalogue, nos. 109–123; Table 7)

9.1 Sources

Appian is our main source for the next set of siege narratives, particularly the first book of his *Bella Civilia*, and the *Mithridatica*, both of which encompass the period from Sulla to Pompey. Although Appian does not name his sources, he is generally regarded as a reliable compiler of history. Some information is also gleaned from the *Vitae Parallelae* of Plutarch, his approximate contemporary, and both men probably drew upon the memoirs of Sulla, amongst other material.

Many sieges of the 80s are known only by name, and consequently have been omitted from the Catalogue. Canusium (App., *Bell. Civ.* 1.52) and Pompeii (Orosius, *Contra pag.* 5.18.22; Vell. Pat. 2.16.2) were reportedly besieged in 89 B.C., Nola in 88 (Vell. Pat. 2.18.4), Norba in 82 (App., *Bell. Civ.* 1.94), and Volaterrae some years later (Livy, *Per.* 89), but we have no details. Similarly, Fimbria's siege of Ilium (Oros., *Contra pag.* 6.2.11; App., *Mithr.* 53), which he sacked and burned in 85 B.C., remains a shadowy affair, as does his own confinement by Sulla in Thyatira (Oros., *ibid.*), an event which ended in his suicide. Fimbria's operation at Pitane (Oros., *Contra pag.* 6.2.10; App., *Mithr.* 52), where he began a surrounding ditch but abandoned the exercise when his quarry, Mithridates, escaped, is also omitted.

For siegecraft of the 70s, many of the Sertorian and Lucullan operations are extremely

uninformative: for example, Sertorius's sojourn in a mountain town (apparently named Clunia: Livy, *Per.* 92) where he was ineptly blockaded by Metellus's forces (Plut., *Sert.* 21.3-4), or Lucullus's siege of Lampsacus (App., *Mithr.* 76), where Mithridates evacuated the defenders by sea. Such episodes are instructive in reminding us of the gaps in our corpus of evidence.

9.2 Roman siegecraft during the early 1st C. B.C.: Commentary

Apart from Sulla's attempt on Piraeus in 87-86 B.C. (no. 111), and Pompey's siege of Jerusalem in 63 B.C. (no. 122), both full-scale operations, there are few hints of heavy machinery in the remaining examples from this period.

Only five of the sieges show signs of having been based on the strategy of blockade. Asculum (no. 109) was invested for over a year, but there is no mention of entrenchments, and it is likely that the besiegers simply encamped on the approach roads. A similar situation obtained at Heraclea Pontica (no. 117), which finally fell to treachery; a naval blockade, rather than earthworks, kept supplies out. By contrast, Praeneste (no. 113) was surrounded by ditches and a wall. The siege of Isaura Vetus (no. 115) may have involved earthworks, to judge from the reference to a Roman fortification (*munitio*), but the term is ambiguous; the town surrendered when the water supply was interrupted. Similarly, the water supply of Langobriga (no. 114) was cut, in order to force the townsfolk's surrender. Only at Asculum and Praeneste did a formal blockade lead to the surrender of the town.

At a sixth town, Amisus (no. 118), the siege is said to have proceeded in a leisurely fashion, but this perhaps had less to do with a blockading strategy than with the hope that, if in the meantime Mithridates were defeated in battle, the garrison would capitulate. No doubt, a watch was placed on the gates, but the townsfolk evidently repulsed several Roman assaults before the final, successful escalade.

Despite the appearance of a blockade at Athens (no. 112), with the intercepting of supplies and the digging of a surrounding ditch, it is clear that the eventual assault was simply delayed by Sulla's overseeing of the operations at Piraeus (fig. 10). There was

never any intention to starve the city into submission; rather, it was simply taken by escalade during a lull in Sulla's operations at Piraeus. Tigranocerta (no. 120), too, was encircled by a ditch, but not as part of a blockading strategy; the Romans were in the process of undermining the walls, when the town was betrayed to them. No doubt, a storming assault would have been launched against Aeclanum (no. 110), had not the town surrendered when her wooden palisade was threatened by fire.

Embankments were constructed for the approach of towers at Themyscira (no. 116), but a simultaneous tunnelling attack was frustrated by the counter-tunnelling of the defenders. Lucullus's strategy at Nisibis (no. 121) seems also to have involved embankments; although the strength of the defences thwarted all direct attempts, he was eventually able to utilise the embankments for a *coup de main*. By what means Sinope (no. 119) was assaulted, remains unknown; events came to a head when the garrison installed by Mithridates opted to escape, and it is likely that the townsfolk, freed from Cilician oppression, simply opened their gates to Lucullus. Similarly, we know nothing of the means by which Solonium (no. 123) was captured, although parts of the town had been set on fire, probably by incendiary missiles.

Operations at Piraeus (no. 111) and Jerusalem (no. 122) are of quite a different order. At the first, after an escalade failed, Sulla unleashed a full scale attack, involving an embankment and battering-rams; amongst other machinery, there is mention of a shed, no doubt to protect the workers, and two towers, giving covering fire. Piraeus finally fell when a section of wall was breached by battering-ram; the same feat had been accomplished once already, but had not been exploited rapidly enough, thus allowing repairs to be effected. At the second, Pompey constructed embankments to carry his battering-rams across the Temple's defensive ditches under covering fire from siege-towers, and eventually demolished one of the towers, enabling his troops to storm in.

9.3 Roman siegecraft during the early 1st C. B.C.: Discussion

Again, it is difficult to substantiate the claims of modern writers that Roman siegecraft of the period was based on the blockade. There is no explicit evidence for the use of cordons or pickets, such as had been used in the Macedonian wars (above, p. 32) and, to

a lesser extent, in the Spanish wars (above, p. 35), to isolate towns. Encircling entrenchments were dug for three sieges, but a blockading strategy was pursued at only one of these: Praeneste. By contrast, the town of Asculum was reduced by blockade, but neither it nor Heraclea were apparently hemmed in by siege-works. Nor was Langobriga, where Metellus was prepared to sit and wait for the inhabitants to surrender from lack of water, although the same strategy at Isaura Vetus may have been accompanied by some form of siege-works. Five blockades out of a sample grouping of fifteen sieges is not evidence of a preferred strategy. Even adding Amisus and Athens, where it may be argued that a *de facto* blockade existed prior to the successful storming assault, increases the total to only seven out of fifteen.

Two of the sieges demonstrate the survival of the full-blown Hellenistic-style of mechanised assault, with siege-towers providing covering fire while battering machines advanced along an embankment. Piraeus (no. 111) and Jerusalem (no. 122) stand in the Hellenistic tradition of siegecraft rather than any contemporary Roman operations. Cotta's failed attempt to assault Heraclea (no. 117) with machinery demonstrates that it was not a guaranteed method of conquest, but required patience and expertise.

9.4 Roman siegecraft during the early 1st C. B.C.: Conclusion

Encircling entrenchments were dug at three (perhaps four) of the fifteen sites (20% / 27%), but only one (perhaps two) took the form of a blockade; one was stormed, and another was in the throes of a mining assault when it was treacherously handed over. Out of five blockades (33%), one was abandoned and another ended when the town was taken by treachery. Embankments were constructed at four sites (27%) for the advance of heavy machinery; at two of these, the walls were breached and the objective achieved; at another, operations were abandoned in the face of tenacious defence; and in the last, the embankments facilitated a surprise escalade. In total, operations at two sites were abandoned (13%), a modest proportion more in keeping with the Second Punic War and the Macedonian Wars (Tables 3–4, pp. 27, 33) than with the more recent Jugurthine War (Table 6, p. 42). Six towns were stormed successfully (40%) and one was left undefended (7%); two towns were delivered by treachery (13%); and four towns surrendered (27%) (see Table 7, p. 47).

	Asculum	Aeculanum	Piraeus	Athens	Prænestes	Langobriga	Isaura Velus	Themyscira	Heraclea Pontica	Amisus	Sinope	Tigranocerta	Nisibis	Jerusalem	Solonium		
	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123		
investing works constructed				x	x		?					x				4	27%
cordon thrown around town																0	0%
assault ramp(s) constructed			x					x					x	x		4	27%
blockading strategy	x				x	x	?		x							5	33%
siege abandoned						x		x								2	13%
town abandoned											x					1	7%
town surrendered	x	x			x		x									4	27%
town delivered by treachery									x			x				2	13%
mass suicide																0	0%
town stormed			x	x						x			x	x	x	6	40%
- wall breached			x											x		2	13%
- gate forced																0	0%
- escalade				x					x	?			x			4	27%
- open gate									x							1	7%
- wall crossed																0	0%
- wall undermined			x									x				2	13%
- tunnelling			x					x								2	13%

Table 7: Sulla to Pompey: early first century B.C.

10. Caesarian Siegecraft (Catalogue, nos. 124–149; Table 8)

10.1 Sources

The period down to 44 B.C. is covered by the second book of Appian’s *Bella Civilia*, and the books of Cassius Dio’s *History* covering the years 68–10 B.C. have survived intact. Incidental details of siegecraft can again be gleaned from certain of Plutarch’s *Vitae Parallelae*, as well as book two of the *Historiae Romanae*, written by Velleius Paterculus in A.D. 30. But the major source for this section is the *corpus Caesarianum*, comprising the work of Julius Caesar and his continuators, describing the campaigns in Gaul and the subsequent Civil War with Pompey and his supporters.

10.2 Roman Siegecraft in the Caesarian period: Commentary

Widespread use of the circumvallation constitutes a major departure from previous periods (Table 8, p. 55). The best-known example is Alesia (no. 134), where archaeology

provides an interesting counterpoint to Caesar's description. But, at the unnamed town of the Atuatuci (no. 126), and at Vellaunodunum (no. 130), Uxellodunum (no. 135), Corfinium (no. 137), Brundisium (no. 138), Thapsus (no. 147), and Ategua (no. 149), Caesar's operations commenced with the encirclement of the town. Cicero acted similarly at Pindenissus (no. 136), during his governorship of Cilicia, as did Scribonius Curio, besieging Utica (no. 140) on Caesar's behalf, and the Caesarian, Cassius Longinus, was hemmed in by Claudius Marcellus's circumvallation, while encamped outside Ula (no. 146). Interestingly, the reference to Marcellus's "outer fortifications" at Ula hints at a double line, the so-called "bicircumvallation" (above, p. 36).

Caesar employed virtually the same tactic in his attempt to immobilise Pompey near Dyrrachium (no. 143; fig. 17), but the strategy was subtly different. Caesar's narrative shows that he appreciated the unorthodox nature of the operation: he aimed to pin down Pompey's army, to prevent it from disrupting his foraging activities and to deny it access to the armaments stored at Dyrrachium; he further hoped to humiliate his adversary (Caes., *Bell. Civ.* 3.43, 47). However, in the game of manoeuvre and counter-manoeuve, Pompey managed to break out of the trap before Caesar could develop his strategy.

But are the other Caesarian circumvallations necessarily indicative of a blockading strategy? Alesia (no. 134; fig. 13) demonstrates such glorious overkill in the profusion and diversity of its defences that it is usually highlighted as the ideal Roman siege; it is also one of the few clear examples of "bicircumvallation". However, besides Alesia and Dyrrachium, there are only three sieges where Caesar opted for the passive containment of an opponent, as Scipio had done at Numantia or Appius Claudius at Capua. The siege of Uxellodunum (no. 135) was clearly a blockade, with the interception of foodstuffs and the cutting of the water supply. So was the confinement of the Pompeians in Thapsus (no. 147; fig. 19); here, like the Carthaginians in Lilybaeum two hundred years earlier, the inhabitants held out until the war was lost elsewhere. And Caesar's attempt to hold Pompey at Brundisium (no. 138), while perhaps more reminiscent of Dyrrachium than Alesia in its unorthodox circumstances, was based on a blockade; it

was only on receiving news of Pompey's imminent break-out that Caesar attempted an impromptu escalade.

Another two may be added: Curio would perhaps have adopted a blockading strategy at Utica (no. 140) if the rumour of Juba's approach had not prompted his withdrawal, but we cannot be certain. And Marcellus clearly would have blockaded Longinus at Ulia (no. 146), had not Lepidus obliged him to desist. The only other contemporary blockades occurred at Salona (no. 141), where the Pompeian, Octavius, surrounded the town, not with a circumvallation, but with five separate camps, and Ulia again (no. 148), where Caesarian forces easily infiltrated the Pompeian lines and entered the town unseen; the former ended in failure when the townsfolk stormed Octavius's camps in sequence, and the latter when other commitments forced the Pompeians to withdraw.

Five circumvallations remain to be explained. One of these, Vellaunodunum (no. 130), surrendered on the third day, before Caesar's strategy was made clear, and another, Corfinium (no. 137), was delivered by treachery while the circumvallation was under construction. The other three fall into a category already encountered at Orongis (no. 57) during the Second Punic War (above, pp. 23f.), and at Ambracia (no. 83) and perhaps Oreus (no. 68) during the Macedonian wars (above, pp. 30f.): the investment divorced from a blockading strategy. At the unnamed town of the Atuatuci (no. 126), Caesar's intention was clearly a battering assault, but the inhabitants stalled until they could mount a sortie; Caesar broke down the gate and sacked the town. Similarly, at Ategua (no. 149), the main thrust was a battering attack, and the townsfolk surrendered when the expected Pompeian reinforcements failed to materialise; and at Pindenissus (no. 136), the steady approach of Cicero's embankment drove the inhabitants to surrender. In each case, the circumvallation was clearly intended as a psychological device, to underline the inevitability of the Roman assault and to promote despair in the defenders.

Besides these three, a further six sieges involved the construction of an embankment. At three sites, this was clearly for the advance of heavy machinery: at Noviodunum (no. 124), the townsfolk surrendered when they saw how rapidly the siege-works were constructed; the Sotiates (no. 128) made the same decision when their attempts to disrupt

the siege-works failed; and so did the inhabitants of Massilia (no. 139), though after more prolonged efforts. At another two sites, the embankments were evidently conceived as causeways, to facilitate the delivery of a massed infantry attack. During the campaign against the Veneti (no. 125), Caesar constructed an embankment to bridge the flood-waters protecting each town at high tide, but the final assault was foiled each time by the townsfolk's timely departure by sea. However, at Avaricum (no. 132; fig. 11), where the embankment carried a successful assault up to the battlements, the townsfolk fought to the end, and were slaughtered when the legionaries poured over the ramparts.

In the sixth and final instance, at Uxellodunum (no. 135; fig. 15), the embankment was not intended to carry a direct assault on the town, but to elevate an artillery-armed siege-tower, so that fire could be directed at an otherwise protected location. Like the other examples, the Uxellodunum embankment will have taken the form of a ramp, up which the siege-tower was propelled.

Of course, an embankment was not a prerequisite of an assault. At Gergovia (no. 133; fig. 12), Caesar's strategy appears to have been a gradual creeping forward, consolidating ground as he went, but the impetuosity of his troops botched his plans, and the operation was abandoned. Sudden attack marked the operations at Cenabum (no. 131) and Gomphi (no. 144); at the former, when the townsfolk attempted to depart by night, Caesar gave the order to burn the gates and sack the town, while at the latter, finding the gates closed against him, Caesar took the place by escalade. During the events at Alexandria in 48 B.C. (no. 145; fig. 18), Caesar made an amphibious landing on the Pharos island and routed the defenders. The method of Crassus's assault on Zenodotium (no. 129), en route to his death at Carrhae, is not known, nor of Pompeius's assault on Oricum (no. 142), after he captured the harbour. And the surrender of Alexandrion (no. 127) to Gabinius, while conceivably occasioned by a blockade, seems more likely to have followed some kind of assault.

10.3 Roman Siegecraft in the Caesarian period: Discussion

Seventeen of the twenty-six sieges from this period were prosecuted by Caesar himself, which accounts for the huge influence he exerts on modern siegecraft studies. A signif-

icant shift in siegecraft techniques is evident, with a strong emphasis on the encircling of an opponent with entrenchments. Unfortunately, this mode of practice, which had occasionally been employed in the past but was frequently adopted by Caesar seemingly out of personal preference, has become enshrined in modern scholarship as the archetypal Roman method. For example, Roth has recently asserted that “circumvallations remained a feature of Roman sieges ... (and) practically every siege involved the building of these siege walls” (1999, 316). The same sentiment is implicit in the choice, by both Webster (1985, 246-252) and Goldsworthy (2000, 86-87), of Alesia to exemplify Roman Republican siegecraft, and Le Bohec traces imperial siegecraft back to Alesia (1989, 144-145). Fuller’s “classical siege” (by which he probably means “standard Republican siege”) involves two lines of encirclement, in the manner of Alesia (1965, 96), and Caesar’s use of the circumvallation is surely at the root of Veith’s general theory of Roman blockade, with its emphasis on “the specifically Roman art of field fortification”, which, he claims, reached its zenith in the period of the so-called “Kohortentaktik” of Caesar (1928, 442: “der spezifisch römischen Feldbesfestigungskunst”).

However, Caesarian circumvallations have more to do with Caesar’s use of field fortifications in general, than with any development of siegecraft *per se*. At Gergovia (no. 133; fig. 12), for instance, he linked his two camps with earthworks, comprising twin 12-foot ditches and, it is assumed, the accompanying banks of upcast material. (Fuller 1965, 141, wrongly interprets the ditches as “communication trenches”.) Nor was it only in the context of siege operations that Caesar dug earthworks, but, for example, in support of his position against the Belgae in 57 B.C. (Caes., *Bell. Gall.* 2.8), or protecting his flanks in an advance on Uzitta in 46 B.C. (*Bell. Afr.* 51). Incidentally, Fuller has misunderstood the function of such field fortifications, and indeed the entire Roman practice of encamping, when he condemns them as the signs of “mobile trench warfare” (1965, 87; enthusiastically followed by Peddie 1994, 60-62; criticised by Goldsworthy 1996, 112-113).

If the circumvallation is symptomatic of Caesar’s siegecraft, unfortunately the form and layout of the entrenchments have led to a misinterpretation of the underlying function, for, as we have seen, in only a very few instances were these siege-works indicative of a

passive blockading strategy. This distinction is appreciated by Liebenam, who classifies the straightforward blockade separately from the blockade in combination with a mechanised attack (Liebenam 1909, 2236: “die Einschließung, Blockade, ... den förmlichen Angriff mit Belagerungswerkzeugen und Blockade”). Even Veith appears to concede that a distinction exists, for the Caesarian period at any rate; although he gives pride of place to the simple blockade, as exemplified by Alesia, he allows that the besieging attack might include an encirclement (Veith 1928, 445; cf. 1906, 55). Nevertheless, modern authorities continue to generalise from the example of Alesia, rather than from the likes of Pindenissus (e.g., Connolly 1981, 293).

There is also an increase in ramp-building, which has encouraged Veith’s emphasis on the constructional expertise of the Romans. He draws a fundamental distinction between the Greek method of “simply heaping up earth” (1928, 443: “primitive Erdaufschüttung”) and the Roman method of driving forward a mighty wooden terrace (*ibid.*: “mächtige Holzterrasse”), which he identifies as a Caesarian trait. But neither the ramp nor the wooden-framed design were Roman, far less Caesarian, innovations (see below, p. 142), and the siege embankment had already appeared in a Roman context during Scipio Africanus’s siege of Utica in 204 B.C. (no. 64), to facilitate the advance of battering-rams. No doubt unduly influenced by Caesarian strategy, Rice Holmes has considered the embankment (for which he prefers the French term, ‘terrace’) to be “usual in regular sieges”, explaining that “as soon as the terrace approached the wall, a battering-ram should be employed to effect a breach” (Holmes 1911, 81). It is noteworthy that, at Avaricum and the Venetian *oppida*, the embankments were intended to carry not machinery, but infantry: if not exactly a Caesarian innovation, then certainly a tactic given a new emphasis by Caesar. Finally, his embankment at Uxellodunum did not even deliver a direct assault, but was conceived in a supporting role.

Heavy machinery was used on occasion, but seldom played a decisive role in the sieges which form our sample group, presumably in part because of the nature of the Gallic defences, in part because of Caesar’s unorthodox methods. Various protective devices were still required, wherever construction was carried out, as well as siege-towers, whose primary purpose was to provide a vantage point for covering fire, and, although

wall-battering and mining techniques were inappropriate tactics to use against the Gallic *oppida*, Caesar threatened the Atuatuci with a battering-ram and apparently had several with him in Alexandria.

10.4 Roman Siegecraft in the Caesarian period: Conclusion

A high proportion of sieges, twelve out of a sample grouping of twenty-six, involved a circumvallation (46%), but only seven of these were prosecuted as blockades; in total, only nine of the twenty-six sieges (including the uncertain case of Utica) followed a blockading strategy (35%). Of these, only three (nos. 134, 135, and 147) culminated successfully with the surrender of the town; another two were specifically intended to confine Pompey (nos. 138 and 143), but failed; and the remaining four were abandoned (nos. 140, 141, 146, and 148). (See Diagram 1; Table 8, p. 55.)

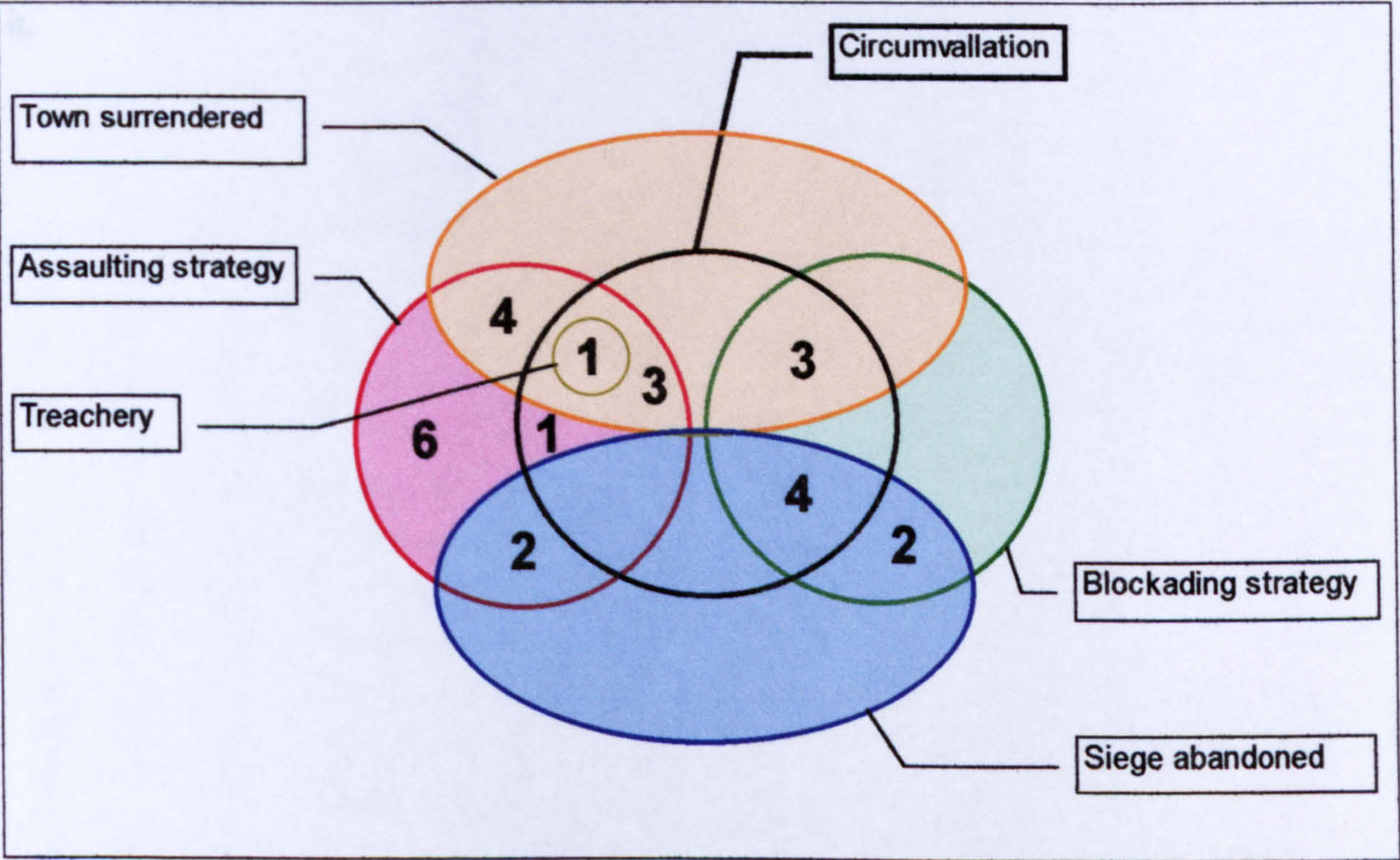


Diagram 1: Roman sieges of the Caesarian Period

By contrast, a strategy of active assault can be demonstrated, without doubt, at the nine sieges involving embankments (35%), and with some likelihood at fourteen sieges (adding the five assaults without embankments), and was probably intended at all seventeen non-blockades (65%). Interestingly, five of these featured circumvallations, three of

which brought the surrender of the town (nos. 130, 136, and 149); one other was handed over by treachery (no. 137, assuming Caesar's strategy at Corfinium to have been broadly one of assault), and the last (no. 126) was successfully assaulted. Of the remaining twelve, non-encirclement sieges, two were abandoned (nos. 125 and 133), four led to a surrender (nos. 124, 127, 128, and 139), and six culminated in a successful assault (nos. 129, 131, 132, 142, 144, and 145). (These complicated permutations are clarified in Diagram 1.)

In total, eight sieges were abandoned (31%), a similar proportion to that found during the Spanish and Jugurthine Wars (Tables 5–6, pp. 40, 42). Ten resulted in the town's surrender (38%), one town was delivered by treachery (4%), and seven were successfully stormed (27%), at least two by escalade and two by breaking open the gates. Only at one site is there a hint of a wall breach, and apparently no attempt was made to enter it.

	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149		
investing works constructed			x				x				x	x	x	x	(x)		x			x			x	x		x	12	46%
cordon thrown around town																											0	0%
assault ramp(s) constructed	x	x	x		x				x			(x)	x			x										x	9	35%
blockading strategy											x	x			x		?	x		x			x	x	x		9	35%
siege abandoned		x								x					x		x	x		x			x		x		8	31%
town abandoned																											0	0%
town surrendered	x			x	x		x				x	x	x			x								(x)		x	10	38%
town delivered by treachery														x													1	4%
mass suicide																											0	0%
town stormed			x			x		x	x										x		x	x					7	27%
- wall breached																									?	1	4%	
- gate forced			x					x																			2	8%
- escalate															(x)				x		x						3	12%
- unopposed entry																						x				1	4%	
- wall crossed									x																	1	4%	

Table 8: Caesarian Period

11. The Late Republic (Catalogue, nos. 150–166; Table 9)

11.1 Sources

Siegecraft of the period from the death of Julius Caesar down to the death of Augustus is illuminated chiefly by books three to five of Appian's *Bella Civilia*. As before, details can be gleaned from Cassius Dio and Plutarch. However, the works of Josephus, who wrote under the patronage of the emperor Vespasian and his sons, become increasingly important for operations mounted in the Near East.

11.2 Roman Siegecraft in the Late Republic: Commentary

From experience of siegecraft in the Caesarian period (§10, pp. 47ff.), the widespread use of circumvallatory siege-works might be anticipated. But, contrary to expectation, circumvallation figures in only five of the seventeen sieges in this section, with a further two involving the use of cross-walls: Antony's ditch-and-palisade barrier across the Brundisium promontory (no. 156), and Cassius's cross-wall on the Laodicea promontory (no. 152) (see Table 9, p. 60). In 44 B.C., Antony encircled Mutina (no. 150), but was increasingly threatened by successive relieving forces, and departed in the following year. Octavian perhaps drew a lesson from Antony's failure, for, when he trapped the latter's brother, L. Antonius, in Perusia (no. 155) late in 41 B.C., he built an elaborate system which apparently also faced outwards in the manner of Connolly's "bicircumvallation" (above, p. 36); Antonius's attempts to break out were foiled and he succumbed early the next year.

Interestingly, the other three examples of investment were also conceived by Octavian. At Promona (no. 164), he was in the process of encircling the hill-top town and two neighbouring hills, when his troops seized the opportunity of entering through an open gate to capture the place. It is doubtful whether a blockade was originally intended, though. In the previous year, he had encircled Segesta (no. 162), but proceeded to raise embankments, and captured the town, it is assumed, by storm. On the other hand, a blockade was probably intended at Mons Medullius (no. 166), where the rebellious Cantabrians chose suicide over captivity.

Besides Perugia, Mutina, and Mons Medullius, two further sieges bear the hallmarks of a blockade: Samosata (no. 157) and Aradus (no. 158) in 38 B.C. Unfortunately, our knowledge of these is sketchy. At the former, Antony was able to extort payment from Antiochus (though not as much as his lieutenant, Ventidius Bassus, had previously negotiated), which suggests that the city had been blockaded. There is no question of siege-works, and the entire incident displays an opportunistic quality. At the latter, the island town had apparently been under siege for some time; certainly, by the time Sosius captured it, the townsfolk were suffering from starvation and disease. Again, no siege-works are evident, and the method of capture is uncertain, but it seems likely that the town capitulated.

As a rule, a blockading strategy will result in one of only two possible outcomes: failure, whereby the operation is abandoned, as happened at Mutina; or success, whereby the defenders agree to come to terms, as at Perugia, Samosata, and (it is assumed) Aradus. Mons Medullius demonstrates a third, if somewhat extreme, alternative: suicide.

Four sieges took the form of a mechanised assault, three of them in combination with embankments. At the fourth, Xanthus (no. 154), rather than piling up an embankment, the attackers levelled the ground for the advance of machinery. The wall was apparently breached, but Brutus failed to capitalise on his success, giving the Xanthians time to repair their wall; the Romans subsequently concentrated on breaking the gates open. At Laodicea (no. 152), Dolabella was trapped on the peninsula by Cassius's entrenchments, and a naval defeat denied him an escape like that of Pompey at Brundisium; an embankment was raised to carry battering-rams up to the wall, but, in the event, the town was delivered by treachery. Embankments were raised at Jerusalem (no. 159), too, for the advance of towers and battering-rams, which breached two walls on the way to the Temple; the Temple itself was taken by escalade. Octavian raised embankments for battering-rams at Metulum (no. 161; fig. 20), but resorted to storming the town by boarding-bridge; the assault was unsuccessful, but the townsfolk surrendered when they saw the Romans preparing for another attempt. Surrender also occurred at Siscia (no.

163; fig. 21), where Octavian drew the defenders into the open for a river combat, and defeated them.

It seems that Antony had no machinery at Praaspa (no. 160), for his siege-train had lagged behind and, lacking adequate protection, had been destroyed by the Parthians. Nevertheless, his strategy hinged on the raising of embankments, but he could achieve nothing decisive with limited numbers and was forced into an ignominious withdrawal. Here, the embankments were perhaps originally intended for the lost machinery, but, as Antony continued with their construction, he perhaps envisaged using them to carry an infantry assault up to the level of the town battlements, like Caesar's embankment at Avaricum (no. 132); the "machinery" which Dio (49.28.1) alleges to have been abandoned on Antony's departure will have been shelters and the like.

Other operations were based on simple assault. Smyrna (no. 151) was taken in a classic *coup de main* by escalade, but there are no details of the siege of Genucla (no. 165), except that it fell to an assault. And, having crushed the Rhodian navy, Cassius began to attack Rhodes town (no. 153) by land and sea; in the event, it was taken by treachery.

11.3 Roman Siegecraft in the Late Republic: Discussion

In contrast to Caesarian siegecraft, no emphasis on circumvallation can be discerned, and, although embankments certainly figure in several sieges, they are by no means universal. A blockading strategy was followed at a mere five sites, only three of which also had a circumvallation. This, along with examples from earlier periods, demonstrates the error of equating a blockading strategy with the physical infrastructure of a circumvallation. Liebenam makes this mistake when, dividing Roman sieges into three categories, he labels the first "encirclement, blockade" (1909, 2236: "die Einschließung, Blockade"), as if the two terms are synonymous. Although he admits the possibility of combining an encirclement with a mechanised assault (1909, 2239, claiming very few examples), he fails to recognise a further permutation; namely, the blockade *without* encirclement.

Of course, Liebenam is not alone in this; he has simply made explicit an assumption

that remains tacit with other scholars. Veith, for example, has stated that, “with land-fortifications [i.e., as opposed to maritime fortifications], the full encirclement was not always possible” (1928, 448: “Auch bei Landfestungen war aber die volle Zernierung nicht immer möglich”). He might equally have said that the full encirclement was not always desired.

Besides an emphasis on entrenching, Veith has also claimed that the Romans followed in the tradition of Greek poliorcetics, though apparently applying Greek methods in a more regimented manner (Veith 1928, 443). For this statement, he cites “the great Caesarian sieges” and Sulla’s siege of Athens, but we have seen that the former are quite distinctively Caesarian (§10, pp. 47ff.), diverging sharply from any Greek antecedents, and the latter (Veith has surely confused the siege of Athens with that of Piraeus) belongs with a discussion of pre-Caesarian siegecraft (see above, p. 45).

Nevertheless, the joint Herodian and Roman siege of Jerusalem in 37 B.C. (no. 159) certainly follows in the Hellenistic tradition of Sulla’s siege of Piraeus, and Antony would probably have mounted a similar operation at Praaspa (no. 160), had he not been thwarted by the loss of his siege-train. There is little evidence of Veith’s imagined regimentation, although, in comparison with Hellenistic strategy, a more conservative attitude can perhaps be detected. The operations at Laodicea (no. 152), Xanthus (no. 154), and Metulum (no. 161), for instance, suggest that Roman armies were content to employ a limited range of machinery to achieve their objective.

11.4 Roman Siegecraft in the Late Republic: Conclusion

Of the seventeen sieges in this section, only seven involved entrenchments (41%), five in the form of a circumvallation and two in the form of a barrier wall. Two of these, plus another three, saw the erection of embankments (29%), a clear indicator of an assaulting strategy. In fact, a blockading strategy is apparent at just five sites (29%), only three of which also had a circumvallation. By contrast, successful assaults were launched at six sites (35%) and intended at another six, two of which were delivered by treachery, two were abandoned and two surrendered. In all, five sieges ended in surrender, including the uncertain case of Aradus (29%) (Table 9, p. 60).

	Mutina	Smyrna	Laodicea	Rhodes	Xanthus	Perusia	Brundisium	Samosata	Aradus	Jerusalem	Praespa	Metulum	Segesta	Siscia	Promona	Genucia	Mons Medullius		
	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166		
investing works constructed	x		x			x	x						x		x		x	7	41%
cordon thrown around town																		0	0%
assault ramp(s) constructed			x							x	x	x	x					5	29%
blockading strategy	x					x		x	x								?	5	29%
siege abandoned	x						x				x							3	18%
town abandoned																		0	0%
town surrendered						x		x	?			x		x				5	29%
town delivered by treachery			x	x														2	12%
mass suicide																	x	1	6%
town stormed		x			x					x			x		x	x		6	35%
- wall breached					x					x								2	12%
- gate forced					x													1	6%
- escalade		x								x								2	12%
- open gate															x			1	6%
- wall crossed																		0	0%

Table 9: Late Republican Period

12. The Early Empire (Catalogue, nos. 167–176; Table 10)

12.1 Sources

Our view of siegecraft in the early Principate, from the last years of Augustus down to the death of Nero, stems almost entirely from the *Annales* of Tacitus, written around A.D. 120 and based on impeccable sources including the Senate’s archives. Additional details can be gleaned from Cassius Dio’s *History*, which survives virtually intact for the period from Augustus down to A.D. 46, and, as before, operations in the East, particularly in Judaea, are illuminated by the Jewish historian, Josephus. Again, only those operations for which we have reasonable detail are included; so, for example, Germanicus’s assault on Raetinum in A.D. 9, during which the defenders fired their own town (Cass. Dio 56.11.3–4), and the two strongholds stormed in A.D. 58 (Tac., *Ann.* 13.39), on the same day as Volandum (no. 173), are omitted, because we can form no clear idea of their conduct.

12.2 Roman Siegecraft in the Early Empire: Commentary

There is a noticeable preponderance of storming assaults amongst the ten examples assembled in this section (see Table 10, p. 63). Both Celenderis (no. 169) and Uspe (no. 172) were taken by escalade, the former in a *coup de main*, the latter after the townsfolk had been subjected to missile-fire from siege-towers. Corbulo's attack on the town of Volandum (no. 173) in A.D. 58 took the form of an escalade, coordinated with the attempt of a legionary *testudo*-formation to undermine the wall; in fact, while troops assaulted the walls, a gate was broken open, which may have been the real objective of the *testudo*-formation. Finally, in A.D. 66, when Cestius Gallus failed to overawe the insurgents in Jerusalem (no. 176) with a show of strength, he ordered repeated escalades of the Temple platform, while a legionary *testudo*-formation attempted to undermine the wall and assault the gate; after five days, he abandoned the attempt and was harried out of Judaea.

The action at Legerda (no. 175) in A.D. 59 probably took the form of an escalade, too. Having chased the garrison inside their walls, Corbulo "burst in" and captured the place. Tacitus's report is concise in the extreme, but he appears to suggest the use of an embankment, probably to carry the troops up and over the town walls. In A.D. 9, Germanicus reportedly attacked Splonum (no. 167) using "machines", but made no headway until a dislodged parapet created panic in the town; Dio's "machines" could conceivably have been ladders, and Germanicus's entry into the town to receive the surrender of the citadel may have been by escalade.

The future emperor Tiberius's attack on Andetrium (no. 168) took a different form. Unable to make any impression on the town's defences, he launched a desperate uphill assault, which the defenders issued out to meet. Unable to match the legionaries in number or in skill, despite their range of improvised countermeasures, which included wagonloads of rocks, the townsfolk were worsted and forced to surrender.

In a variation of a strategy not seen since the Spanish Wars (above, p. 35), Corbulo threw a cordon of light-armed troops around Artaxata (no. 174), while subjecting the town to a long-range barrage, presumably of archer-fire and sling-shot; the town

promptly surrendered. The only comparable incident occurred in A.D. 26 at the Thracian stronghold on Mons Haemus (no. 170); Poppaeus Sabinus encircled the place with a ditch and palisade and a series of guard-posts, before erecting an embankment from which the townsfolk were bombarded with missile-fire. Sabinus's alleged strategy of starvation sits uneasily with the presence of an embankment, but he perhaps hoped to cover all eventualities. On the other hand, Trebellius (possibly the future governor of Britain, L. Trebellius Maximus) relied only on starvation to persuade the rebel Cietae to respect his authority; he surrounded their adopted hill-top position at Cadra and Davara (no. 171), presumably with some kind of circumvallation, and awaited their surrender.

12.3 Roman Siegecraft in the Early Empire: Discussion

Commentators traditionally restrict discussion of imperial siegecraft to the period of the Jewish War (e.g., Connolly 1981, 298; Dobson 1989, 207; Goldsworthy 2000, 144-145; Kern 1999, 311-322; Nischer 1928, 564-566). But these sieges form a discrete group, bounded chronologically and geographically, and for this reason they have been removed from the discussion of early imperial siegecraft (see §13, pp. 64ff.).

Again, the emphasis on circumvallatory siege-works, evident in the Caesarian period (above, pp. 47f.), is absent from our sample group of early imperial sieges. Only two of the ten sieges in the group involved the construction of encircling earthworks, namely Cadra and Davara (no. 171) and the Thracian hill-fort on Mons Haemus (no. 170). At the latter, not only did Sabinus dig a circumvallation, but he constructed an embankment (*agger*), which commanded the interior. An embankment appears to have been used at Legerda (no. 175) to carry storm-troops over the battlements, in the manner (if not on the scale) of Avaricum.

The storming assault is found also at Celenderis (no. 169), Uspe (no. 172) and Volandum (no. 173), all of which took the form of an escalade under cover of missile-fire. An assault would perhaps have ensued at Artaxata (no. 174), had the townsfolk not surrendered so promptly. Three of these assaults were conducted by Domitius Corbulo, the proponent of the *dolabra* as a means of vanquishing the enemy (Front., *Strat.* 4.7.2). It is unfortunate that Le Bohec has chosen to link this maxim with the construction of

siege-works (1989, 146), since Corbulo clearly preferred the storming attack to the building of circumvallatory earthworks. (The maxim is usually taken to refer to the discipline of building marching-camps: e.g., Davies 1968, 104.)

An assaulting strategy was also followed at Splonum (no. 167) and Andetrium (no. 168), though, like Artaxata, both ended in surrender, the latter after a battle outside the walls. Only one siege from our sample was unsuccessful: Cestius Gallus’s poorly organised attempt on the Temple enclosure in Jerusalem (no. 176), which led to an ignominious rout.

	Splonum	Andetrium	Celenderis	Mons Haemus	Cadra/Davara	Uspe	Volandum	Artaxata	Legerda	Jerusalem		
	167	168	169	170	171	172	173	174	175	176		
investing works constructed				x	x						2	20%
cordon thrown around town								x			1	10%
assault ramp(s) constructed				x					x		2	20%
blockading strategy				x	x						2	20%
siege abandoned										x	1	10%
town abandoned											0	0%
town surrendered	x	x		x	x			x			5	50%
town delivered by treachery											0	0%
mass suicide											0	0%
town stormed			x			x	x		x		4	40%
- wall breached											0	0%
- gate forced							x				1	10%
- escalade			x			x	x		?		4	40%
- open gate											0	0%
- wall crossed											0	0%
- wall undermined							x			x	2	20%

Table 10: Early Imperial Period

12.4 Roman Siegecraft in the Early Empire: Conclusion

Of the ten sieges in this section, only two involved a circumvallation (20%), and these are also the only operations to have followed a blockading strategy. One of these, along with one other, saw the erection of an embankment (20%), though not for the use of heavy machinery. Assault was the dominant strategy; employed successfully at four

sites (40%) and unsuccessfully at one, it would probably have been used at three others, if surrender had not been so prompt. In all, five towns surrendered (50%), two from the effects of blockade, three from fear of Roman attack, and one operation was abandoned (10%).

13. The Jewish War period (Catalogue, nos. 177–191; Table 11)

13.1 Sources

Sources for Roman siegecraft during the Jewish War period are almost the same as those for the early Principate (above, §12.1). The extant books of Tacitus's *Historiae*, written around A.D. 105, cover the years A.D. 68-70, and are invaluable for events in the West, less so for events in the East. For the latter, we have the contemporary witness of Josephus, who was personally involved, first as a defender and subsequently accompanying the Roman headquarters staff.

13.2 Roman Siegecraft during the period of the Jewish War: Commentary

At Joppa (no. 177), Gabara (no. 179) and Gerasa (no. 185), the town was stormed in a *coup de main* and the inhabitants slaughtered (see Table 11, p. 67). At the double-walled town of Japha (no. 181), the Romans entered the first enceinte on the heels of the fleeing defenders and crossed the second enceinte by escalade. At Cremona (no. 187), the Flavians threw a cordon around the Vitellian camp and broke down the gate, whereupon the defenders made a dash for the nearby town, which was burned and looted in the aftermath. And, in their attack on the Flavians sheltering on the Capitol in Rome (no. 188), the Vitellian Praetorians simply set fire to the place.

At Jotapata (no. 180), Josephus's first-hand report describes how, having failed in his attempts to storm the walls, Vespasian constructed an embankment, apparently to enable infantry to cross the battlements, as Caesar had done at Avaricum. When the defenders foiled his plan by raising the town wall, he resorted to a battering attack and attempted to storm the town through the breach. When this was also thwarted, the em-

bankment was raised again, under the protection of siege towers, and the infantry attack was finally launched.

Embankments figured at five other sites. At Gamala (no. 183), Vespasian constructed embankments to bring up battering-rams, but the assault troops, entering the breach, were thrown back; a second attack, after one of the towers on the town wall was undermined, succeeded. At Masada (no. 191), archaeology confirms that the fortress was encircled with a circumvallation and guard-posts, and an embankment was constructed to carry a battering-ram up to the wall; the defenders committed mass suicide rather than be captured. At Jerusalem (no. 189; fig. 22), Titus orchestrated a major mechanised siege; three embankments carried rams up to the outer ("third") wall and made a breach; the second wall was breached and taken; then, when two pairs of embankments raised against the Antonia fortress and the Temple platform were destroyed by the Jews, a circumvallation was thrown around the city and a new embankment carried battering-rams up to the Antonia fortress; rams were directed at the Temple platform on a pair of embankments, and, when the Antonia was demolished, another pair of embankments carried the Romans up onto the Temple platform, where the Temple was finally destroyed. More embankments were raised against the palace in the Upper city, and the whole of Jerusalem was burned and looted. Archaeology proves that Machaerus (no. 190) was encircled and an embankment raised; but the defenders surrendered in return for the life of one of their compatriots, captured during a sortie.

Finally, at Placentia (no. 186), the Vitellians attempted undermining, gate-breaking and the construction of an embankment, but soon abandoned the attempt in the face of a determined defence. Only one other siege from this period was abandoned incomplete: at Belzedek (no. 178), the Romans were unwilling to invest effort in an assault of the fortified tower, so they set fire to the place instead.

Roman entry was uncontested at two towns: at lakeside Tarichaeae (no. 182), a cavalry force circumvented the defences and routed the rebel elements from the town; and at Mount Tabor (no. 184), the defenders were enticed to leave the safety of their walls and join battle on the plain, where they were defeated.

13.3 Roman Siegecraft during the Jewish War period: Discussion

Commentators on Roman imperial siegecraft usually highlight the Jewish War period (cf. p. 62, above). For Webster, Josephus's narrative of the siege of Jotapata encapsulates imperial siegecraft (1985, 252-254); others use Josephus as the basis for a more wide-ranging discussion (e.g., Le Bohec 1989, 144-145; Goldsworthy 2000, 140-143). Connolly's treatment may be taken as typical: "Roman siege technique in the early principate is best illustrated by the sieges of Vespasian and Titus during the Jewish revolt" (1981, 298). He characterises the standard Roman tactics of the Principate, first, by the use of artillery, and, second, by the construction of "mounds". However, we have seen that embankments played a part in only six of the fifteen sieges in our sample group, and artillery was prominent in even fewer.

Nischer has rightly observed that the siegecraft practised during the Principate generated no particularly characteristic innovations (1928, 564), a fact which he put down to its inherent contingency. The individual commander could inject his own personality into the conduct of a siege to a far greater extent than could the battlefield commander, but, in the final analysis, the besieging methods depended largely on the defensive measures employed by the besieged, and were of course constrained by the available technology.

Nevertheless, even Nischer uses Titus's siege of Jerusalem as the typical "besieging attack" of the Principate (1928, 564-566), although we have seen that it is not at all representative, even of Jewish War sieges: for example, it represents the first of only three occasions on which a circumvallation was used in the period, and may well have been the direct inspiration for the subsequent circumvallations at Machaerus and Masada. Neither is it representative of the early Principate as a whole: for the earlier period, the storming attack appears to have been favoured (above, pp. 62f.). In fact, Jerusalem has been cast in the same role for imperial siegecraft, as has Alesia for the siegecraft of the Republic: a spectacular exception, whose unorthodox progress is celebrated as a high-water mark, and thus misinterpreted as the logical culmination, of the besieger's art.

13.4 Roman Siegecraft during the period of the Jewish War: Conclusion

Of the fifteen sieges in this section, only three involved a circumvallation (20%), and none of these took the form of a blockade. These three were among the six sites where embankments were constructed (40%), and all but one fell to assault. In all, ten sieges were pursued as assaults (67%); of the remaining five, two were uncontested (13%), two were abandoned (including Belzedek, where the objective was not deemed sufficiently important to warrant a siege) (13%), and one town surrendered (7%).

	Joppa	Belzedek	Gabara	Jotapata	Japha	Tarichaeae	Gamala	Mount Tabor	Gerasa	Placentia	Cremora	Capitol (Rome)	Jerusalem	Machaerus	Masada		
	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191		
investing works constructed													x	x	x	3	20%
cordon thrown around town				x												1	7%
assault ramp(s) constructed				x			x			x			x	x	x	6	40%
blockading strategy																0	0%
siege abandoned		(x)								x						2	13%
town undefended						x		x								2	13%
town surrendered														x		1	7%
town delivered by treachery																0	0%
mass suicide																0	0%
town stormed	x		x	x	x		x		x		x	x	x		x	10	67%
- wall breached				(x)			(x)						x		(x)	4	27%
- gate forced	?		?						?		x					4	27%
- escalade				(x)	x								(x)			3	20%
- unopposed entry						x		(x)								2	13%
- wall crossed				x											x	2	13%
- wall undermined							x			(x)			(x)			3	20%

Table 11: Jewish War Period

14. The Second Century (Catalogue, nos. 192–202; Table 12)

14.1 Sources

For the period from Trajan to Septimius Severus, the sources for Roman siegecraft are less detailed than for previous periods; there is no Polybius or Livy, no Caesar or Josephus. Instead, our information comes almost exclusively from Cassius Dio, through the filter of Xiphilinus's epitome. There are two other major sources, each with its own problems: first, Herodian's history of the years 180–238, written probably in the 250s, is uneven in quality, and requires the controlling influence of Dio's parallel account, wherever possible; and second, the enigmatic *Historia Augusta*, comprising imperial biographies down to A.D. 284, is thought to be generally reliable only for the second century emperors. Both provide incidental details for the study of siegecraft.

The general poverty of the literary sources has been supplemented from contemporary sculptural propaganda, in the form of Trajan's Column, which was officially unveiled in A.D. 113. The events depicted on the Column cannot, of course, be interpreted literally (Coulston 1990, 293), so the scenes of Dacians besieging Roman fortifications (e.g., XXXII, casts 77–79 = fig. 39; XCIV, casts 249–251; CXXXIV, casts 358–360) are omitted, as they have only a general historical context. However, it may reasonably be argued that certain scenes of Romans besieging Dacians relate to catalogue entries 190–191, for which they provide additional detail.

14.2 Roman Siegecraft during the Second Century: Commentary

Trajan's sieges of the Dacian hillforts (no. 192) during the First Dacian War probably took the form of storming attacks; the related scenes on the Column depict fort-building, the establishing of an artillery position, and two assaults on Dacian palisades, one by the use of a *testudo* shield-formation. The method by which Sarmizegethusa (no. 193) was captured in the Second Dacian War is not stated by Cassius Dio; it is depicted on the Column as a series of assaults, involving ladder-carrying troops and the attempted demolition of walls using *dolabrae*, although there may be a suggestion of a circumvallation (see below, p. 70).

The period saw the town of Hatra besieged three times by the Romans, unsuccessfully; first, by Trajan in A.D. 117 (no. 196), then by Severus, in A.D. 198 (no. 201) and A.D. 199 (no. 202). Both emperors reportedly breached the walls, but, oddly, neither conquered the city. There are no details of the Trajanic sieges of Edessa (no. 194) and Seleucia (no. 195), or of Lucius Verus's siege of Ctesiphon (no. 198), except that the cities were sacked and burned. Septimius Severus is said to have taken Ctesiphon by a *coup de main* (no. 200).

A blockade was employed by Hadrian's general, Julius Severus, at Bettir (no. 197), where the defenders were forced to surrender from thirst and starvation, and by Septimius Severus's general, Marius Maximus, at Byzantium (no. 199), where the defenders held out for over two years. Traces of a circumvallation have been identified archaeologically at Bettir (fig. 28), but there is no mention of earthworks at Byzantium. This siege demonstrates incidentally that the blockade of a maritime city was perfectly feasible, given time and resources.

14.3 Roman Siegecraft during the Second Century: Discussion

Siegecraft in the second century has been quietly ignored by modern scholars. Webster (1985), Connolly (1981, 298-300) and Kern (1999) do not go beyond the Jewish War, and Nischer's discussion of imperial siegecraft (1928, 564-567) centres on Josephus and Tacitus, with only a brief mention of Trajan's Column. Le Bohec, too, concentrates on Josephus and Tacitus, but he attempts to integrate the evidence of Trajan's Column, which "shows us how the Romans set about capturing Sarmizegethusa" (1989, 143), with reference to a rather poor line-drawing of scenes CXIII and CXIV (casts 300-308). He makes some general use of the sculptures, interpreting scene CXVII (casts 316-318 = fig. 44) as "fixed defences, screens and wooden boarding behind which the soldiers take cover" (1989, 145: "défenses fixes, claies et panneaux de bois derrière lesquels les soldats s'abritent"), and scene CXIII (casts 302-303 = fig. 42) as evidence of assault ladders (1989, 148). (The subject of scene CXVII is open to question, but appears to be more substantial than a defensive screen; see further below.)

The historical sources for this period carry no hint of a circumvallation. Disjointed

lengths of an investing wall have been identified at Khirbet el-Yahud, modern Bettir (below, p. 121), but the low bank surrounding the city of Hatra is unlikely to have been a Roman circumvallation (below, p. 125); it is difficult to justify it as an outwork of the city (as *per* Al-Salihi 1991, 188), and it perhaps relates to the successful Sasanian siege of Shapur I in *ca.* A.D. 240 (*Codex Manichaicus Coloniensis* 18.1-16).

Richmond (1982, 41) followed Cichorius (1900, 223-224) in identifying the wall, curving away from the Roman fort in scene CXIII (casts 300-301) of Trajan's Column, as a circumvallation. It is unlikely, however, that the timber artillery emplacement in scene LXVI (casts 166-167 = fig. 41) also represents a circumvallation (*pace* Rossi 1971, 164), but the wall behind which Trajan and his *comites* are shown in scene CXIV (cast 306 = fig. 43) perhaps represents a siege camp in front of Sarmizegethusa. As previously noted, the interpretation of the timber construction in scene CXVII (casts 316-318 = fig. 44) is uncertain; Lepper & Frere (1988, 168) do not attempt to identify it, Rossi (1971, 194) believes that it represents new siege-machines, and Le Bohec (1989, 145) temporary shelters, but a structure of some sort is more likely. An embankment is perhaps the most appropriate structure for the Romans to be engaged upon at this late stage in the siege, and the subsequent scene of Dacians begging for clemency (CXVIII, casts 319-321) becomes quite understandable, if they have seen their fate sealed by the imminent storming assault which an embankment heralded.

Nischer's argument for an unchanging siegecraft, tailored to the requirements of each individual case, yet bound by the general constraints of technology (1928, 564), finds a faint echo in Goldsworthy's treatment of Roman warfare between the years 14 and 193: "the Romans did relatively little to develop the technical side of siegecraft, but they brought an aggressive, relentless quality to this type of warfare" (2000, 144). Here, again, is the myth that, once committed to a siege, the Roman commander would not give up (*cf.* above, p. 32). Ironically, with three examples out of eleven, the evidence for the abandonment of sieges prior to completion is strong for the second century (see Table 12, p. 71), recalling the high proportion found in the Spanish and Jugurthine Wars and in the Caesarian period (Tables 5-6, 8, pp. 40, 42, 55).

14.4 Roman Siegecraft during the Second Century: Conclusion

Of the eleven sieges in this section, there is clear evidence of circumvallation at only one site; with the possibility that Sarmizegethusa may also have been encircled, two sieges out of eleven involved encirclement (18%). At only one of these was a blockading strategy pursued; the same policy was followed at one other site, though without physical encirclement, making a total of two blockades out of eleven examples (18%). Both resulted in surrender; including the possible case of Sarmizegethusa makes three out of eleven (27%). The three attempts on Hatra were abandoned (27%), and the remaining five sieges were pursued as assaults (45%), though we have no details of the methods employed.

	Dacian Hillfort	Sarmizegethusa	Edessa	Seleucia	Hatra	Bettir	Ctesiphon	Byzantium	Ctesiphon	Hatra	Hatra		
	192	193	194	195	196	197	198	199	200	201	202		
investing works constructed		?				x						2	18%
cordon thrown around town												0	0%
assault ramp(s) constructed		?										1	9%
blockading strategy						x		x				2	18%
siege abandoned					x					x	x	3	27%
town undefended												0	0%
town surrendered		x				x		x				3	27%
town delivered by treachery												0	0%
mass suicide												0	0%
town stormed	x		x	x			x		x			5	45%
- wall breached					x						x	2	18%
- gate forced												0	0%
- escalade												0	0%
- unopposed entry												0	0%
- wall crossed												0	0%
- wall undermined												0	0%

Table 12: Second Century

15. The Third Century (Catalogue, nos. 203–210; Table 13)

15.1 Sources

For the third century, once the works of Cassius Dio and Herodian come to an end, we are left with less reliable sources. However, the *Historia Augusta*, the *de Caesaribus* of Aurelius Victor, and the *Breviarium* of Eutropius, which all appear to have drawn upon the so-called *Kaisergeschichte* of around A.D. 358, can happily be used with care. Amid various minor Byzantine sources, the first two books of the *Historia nova* of Zosimus, covering events down to the sons of Constantine, are useful for Roman siegecraft studies.

15.2 Roman Siegecraft during the Third Century: Commentary

Oddly, the few examples of Roman siegecraft from this period include no clear instance of a storming attack (see Table 13, p. 74). This must have been intended at Cremna (no. 210), where an incomplete embankment has been discovered archaeologically, but the threat of assault (and the assassination of the ring-leader) encouraged surrender. The archaeological remains of a double barrier wall, cutting off the western approaches to the town, are the only hint of a circumvallation from this period, but it is salutary to reflect that the historical sources do not mention any siege-works at Cremna. At two other sites, Aquileia (no. 203) and Palmyra (no. 209), a cordon of troops was thrown around the town; at the latter, the city was blockaded, whereas at the former, the construction of machinery was begun for a mechanised assault. A blockade was also commenced at Agrippina (no. 206), though no cordon is mentioned, and probably only a watch on the gates was maintained.

Cremna, Palmyra and Agrippina all ended in the surrender of the besieged. When the Carpi were besieged in a fortress (no. 205) by Philip the Arab, they sortied out and were defeated in the field, whereupon they immediately surrendered. The siege of Aquileia (no. 203) was abandoned when the disgruntled besiegers, having run short of supplies, assassinated their emperor, Maximinus. Similarly, the siege of Mediolanum (no. 207) was abandoned when the emperor Gallienus fell victim to a plot; he must have intended to assault the walls, because machinery had been moved up. Finally, the town of Tyana

(no. 208) was betrayed to Aurelian, who executed the traitor and held his troops back from plundering the town, thus advertising his clemency and winning the support of the townsfolk.

When the Praetorians were besieged in their camp (no. 204) by the Roman mob reinforced by gladiators, they repulsed their attackers using missile weapons, and, when their water supply was cut, they carried the conflict onto the streets of Rome; the outcome is not known.

15.3 Roman Siegecraft during the Third Century: Discussion

If siegecraft in the second century lacks modern discussion (see above, p. 69), the third century has fared even worse. Of course, this is a general problem for third-century Roman military studies (cf. Campbell 1999, 391-392). In his discussion of siegecraft, Nischer jumps from the early Principate to the fourth-century "Constantinische Epoche" (1928, 600), and treatments of "late Roman siegecraft" routinely begin with Ammianus Marcellinus (e.g., Southern & Dixon 1996, 148; Tomlin 1981, 302).

The absence of storming attacks from our sample group is surprising, although the embankment at Cremna was probably intended for this, and Gallienus was apparently planning an assault at Mediolanum when he was assassinated. However, the rarity of mechanised sieges is more apparent than real. Maximinus constructed machinery at Aquileia, although he had clearly neglected to fire-proof it; Gallienus had machinery at Mediolanum, and, besides the evidence of artillery at Cremna, the existence of an embankment suggests the intention to use battering-rams. On the other hand, neither Postumus at Agrippina, nor Valerian at Tyana, was accompanied by siege equipment, but equally neither had need of it. Perhaps if events had turned out differently, they would have arranged for its construction on the spot.

15.4 Roman Siegecraft during the Third Century: Conclusion

Of the eight sieges in this section, there is evidence of circumvallation at only one (13%); the same siege provides the only evidence of an embankment. At two sieges, a cordon was thrown around the town (25%), but at only one of these, and at one other,

was a blockading strategy pursued (25%). Four sieges, including both blockades, resulted in surrender (50%); three sieges were abandoned (38%); and, in the remaining siege, the objective was achieved by treachery (13%).

	<div>Castra Praetoria (Rome)</div> <div>Aquileia</div> <div>Carpi</div> <div>Agrippina</div> <div>Mediolanum</div> <div>Tyana</div> <div>Palmyra</div> <div>Cremona</div>									
	203	204	205	206	207	208	209	210		
investing works constructed								x	1	13%
cordon thrown around town	x						x		2	25%
assault ramp(s) constructed								x	1	13%
blockading strategy				x			x		2	25%
siege abandoned	x	x			x				3	38%
town undefended									0	0%
town surrendered			x	x			x	x	4	50%
town delivered by treachery						x			1	13%
mass suicide									0	0%
town stormed									0	0%
- wall breached									0	0%
- gate forced									0	0%
- escalade									0	0%
- unopposed entry									0	0%
- wall crossed									0	0%
- wall undermined									0	0%

Table 13: Third Century

16. The Fourth Century (Catalogue, nos. 211–225; Table 14)

16.1 Sources

For the fourth century, ecclesiastical histories, by the likes of Theodoret, mention sieges in order to attribute divine meaning to the events. Incidental details crop up in the works of the pagan Libanius, the emperor Julian, and the panegyricists, all of whom were contemporary with the events they described, and thus well placed to pass on accurate information. This is less often the case with later authors, such as the generally unreliable sixth-century John Malalas. Although written in the fifth century, the third

book of Zosimus's *Historia nova* has much of value, as it was probably based upon the work of fourth-century Eunapius. However, the major source for this period is the *Res gestae* of Ammianus Marcellinus, a participant in the military affairs of the day and a historian of the first rank.

16.2 Roman Siegecraft during the Fourth Century: Commentary

Full-scale Roman operations are evident in Constantine's siege of Byzantium (no. 214), Constantius's attempt to recapture Bezabde (no. 217), and Julian's attacks on Pirisabora (no. 222) and Maiozamalcha (no. 223). All three saw the usual preparations for bringing heavy machinery forward, with troops working under cover of artillery-fire, and the eventual advance of a battering-ram (see Table 14, p. 79). Embankments were constructed at Byzantium, Bezabde and Maiozamalcha, but there is no sign of circumvallatory earthworks, unless Libanius was alluding to this when he likened Constantius's capture of Nineveh in A.D. 343 to catching the city in a net (*Orat.* 59.83-85; there are no details of the siege).

The harbour of Gesoriacum (no. 211) was sealed with a mole, but it seems that the blockade of the town was achieved by guarding the gates; certainly, there is no mention of earthworks. Cordons were thrown round Aquileia (no. 218), Pirisabora (no. 222) and Maiozamalcha (no. 223), but the strategy in each case was one of assault. Similarly, although Constantine deployed his fleet to blockade Byzantium (no. 214), the siege was pursued as a mechanised assault. Diocletian's eight-month siege of Alexandria (no. 212) was surely conceived as a blockade, but unfortunately details are lacking. Constantine's manoeuvring before Verona (no. 213) was intended to set up a blockade of the town, but in the event the garrison sallied out and the fate of the town was decided on the field of battle. And when a party of Franks took refuge in two vacant forts on the River Meuse (no. 216), Julian blockaded them, again presumably by guarding the gates, until they surrendered after almost two months.

When the Romans breached the outer defences of Pirisabora (no. 222) and began the construction of a siege tower for the final capture of the citadel, the townsfolk capitulated. At Byzantium (no. 214), it was Constantine's defeat of Licinius elsewhere that

brought the surrender of the town, although wall-battering had apparently commenced. The equally large-scale attempt on Aquileia (no. 218) was less well managed, however, with a poorly conceived assault on the riverfront by shipboard machines; nevertheless, the defenders surrendered on realising that their emperor was dead and the besiegers now represented the legitimate government. Other surrenders were more immediate: in A.D. 363, the Persian garrison of Anatha (no. 219) was intimidated into surrender by the sight of Julian's siege equipment, and the inhabitants of Diacira and Ozogardana (nos. 220-221) fled at the approach of the Romans.

Besides Maiozamalcha (no. 223), where the Romans famously entered the town through a tunnel, storming assaults were staged at a fort near Seleucia (no. 224), and at the maritime city of Cyzicus (no. 225). The former was captured, despite the involvement of a Persian relieving force, but Ammianus preserves no details; similarly, at Cyzicus, we have no details beyond the fact that the assault was directed from the harbour.

Despite the scale of the Roman operation at Bezabde (no. 217), Constantius's attempts were frustrated by the incendiary attacks of the Persian defenders, and he failed to recapture the town. The usurper Magnentius's attempt to capture Mursa (no. 215) was doomed from the start; lacking machinery, he pinned his hopes on burning the gates down, a tactic easily thwarted by water from above.

16.3 Roman Siegecraft during the Fourth Century: Discussion

After the absence of third-century commentary, the flood gates open with modern treatments of fourth-century siegecraft, however the emphasis is squarely on Ammianus. Nischer's discussion is nothing more than a narrative of Julian's siege of Maiozamalcha, from which he concludes that "the decline of the ancient Roman art of war was not as bad as is often assumed" (1928, 601); in a similar vein, Tomlin observes that the methods used, in the sieges of the Persian theatre at any rate, were all well-tried (1981, 303).

The alleged deterioration of the late army is also questioned by Crump (1975, 113), who devotes a chapter of his study of Ammianus Marcellinus to sieges. However, in the

main, his observations are pedestrian. He notes that “siege warfare in the fourth century posed major military difficulties” (1975, 101), but the same difficulties had faced the besiegers of previous centuries, and largely the same solutions were found.

By far the most detailed discussion is provided by Elton (1996, 258-260), who divides the typical late Roman siege into four phases: the surrounding of the site; the “domination” of the walls by missile fire; the breaching of the walls by battering-ram or the scaling of the walls using siege towers or ladders; and finally, the storming of the town. This is very much a composite picture. In reality, from our sample group of fourteen sieges, only Maiozamalcha (no. 223) follows this scheme.

Indeed, our sample grouping suggests that the surrounding of a site as a prelude to the siege was uncommon, with only three cases involving a cordon of troops, and apparently no instances of earthworks (although see above, p. 75, for Constantius at Nineveh). (In Table 14, p. 79, investing works are indicated at Gesoriacum, but this was a harbour mole, like Caesar’s at Brundisium, rather than a full circumvallation.) Of course, the absence of circumvallations will surprise only those who believe that this was the archetypal Roman style of besieging; in fact, even in the Caesarian period, where we find the technique used most frequently, it accounted for less than half of the sample grouping (cf. Table 8, p. 55).

Crump mistakenly believes, not only that “the attackers usually built a temporary contravallation outside the defenses of each city”, but also that the rampart of this ‘contravallation’ was sufficiently high to overlook the enemy walls (1975, 107-108). This appears to be a misunderstanding of the significance of embankments (1975, 107 n. 45). For example, in the case of Amida (Amm. Marc. 19.8), he believes the purpose of the defenders’ mound at the back of the town wall to have been “to retain a higher vantage” (1975, 108), rather than to bolster the wall against battering attack, as is more likely. If the defenders had wished a higher vantage, they would have increased the height of the town wall, as demonstrated by examples dating back to Plataea (Thuc. 2.75; cf. Jotapata, no. 180).

It has been suggested that, in the late Empire, the blockade was the preferred besieging method. Southern and Dixon claim that it “was utilized whenever possible, since it resulted in fewer casualties for the besieging side and obviously required considerably less effort” (Southern & Dixon 1996, 150); Elton concurs that “blockades were preferred”, reasoning that there would be “fewer friendly casualties” (1996, 258). The logic is attractive, however Southern and Dixon cite no specific cases in defence of their proposition, and, for a fourth century blockade, Elton can name only the forts on the Meuse (no. 216). Oddly, Southern and Dixon go on to explain that “it was rarely possible for the besiegers to completely prevent the besieged from leaving or re-entering their city” (1996, 151). Again, no supporting evidence is quoted, but the example of the River Meuse forts illustrates that, on the contrary, the besieged *were* completely prevented from leaving. This was, after all, the point of a blockade.

Elton believes that “assaults would be chosen only if there was a need to capture the site quickly”, for example because of the proximity of an enemy relieving force (1996, 258). Certainly, the example of Mursa falls into this category. But, in practice, the assault will always have been preferred, precisely because of the time factor. At Bezabde, Constantius’s first choice was an infantry assault, followed by a mechanised assault, but he made no headway; by then, it was too late in the year to sit out a blockade. Similarly, at Aquileia, Immo first tried various assaulting strategies, before falling back on a blockade, which also failed owing to the town’s internal water supply. Julian’s chosen strategy at Anatha appears to have been a *coup de main*, which failed when the garrison detected the approach of his general, Lucillian; Julian’s next reaction was to deploy overwhelming force, whereupon the garrison surrendered. And at Pirisabora, an assaulting strategy was chosen from the start, again resulting in surrender. It seems, then, that there was a real preference for the direct action of an assault, rather than the lengthy inaction of a blockade.

In this context, Diocletian’s eight-month siege of Alexandria appears unusually protracted, which may suggest a blockade that successfully ended in surrender; however, an assault is perhaps more likely, since the town was subsequently looted. Unfortunately, our sources do not say.

16.4 Roman Siegecraft during the Fourth Century: Conclusion

There is no clear evidence of circumvallation at any of the fifteen sieges in this section, although a harbour mole was constructed at one (7%). Cordons of troops were thrown around three towns (20%), two of which surrendered while the third was taken by storm. Embankments were raised at the latter, plus two others (20%). A blockading strategy was pursued at four towns (27%), with success. In all, seven towns surrendered (47%), or eight (54%) if Alexandria is included. More probably, Alexandria fell to assault, along with three others (27%). In two cases, the townsfolk fled to avoid standing siege (13%), and two sieges were abandoned (13%).

	Gesoriacum	Alexandria	Verona	Byzantium	Mursa	River Meuse	Bezabde	Aquileia	Anatha	Diacira	Ozogardana	Pirsabora	Maiozamalcha	Fort near Seleucia	Cyzicus		
	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225		
investing works constructed	(x)															1	7%
cordon thrown around town								x				x	x			3	20%
assault ramp(s) constructed				x			x						x			3	20%
blockading strategy	x	x	x			x										4	27%
siege abandoned					x		x									2	13%
town undefended										x	x					2	13%
town surrendered	x		x	x		x		x	x			x				7	47%
town delivered by treachery																0	0%
mass suicide																0	0%
town stormed		?											x	x	x	4	27%
- wall breached												x	(x)			2	13%
- gate forced																0	0%
- escalade																0	0%
- unopposed entry																0	0%
- wall crossed																0	0%
- wall undermined																0	0%
- tunnel													x			1	7%

Table 14: Fourth Century

17. Roman Siegecraft: Statistical Conclusions (Table 15)

This historical survey would be incomplete without a summary of Roman practice from the First Punic War through to the battle of Hadrianopolis. Consequently, the details of 188 Roman sieges have been lifted from the individual group tables (Tables 2-14, plus no. 45, which does not appear in any tables) and collated to provide an overview (see Table 15, p. 82).

It is worth emphasizing that a sample of this size cannot guarantee irrefutable precision. First, there is the statistical flaw, that we do not have details of every siege that ever occurred. Nor can we know what proportion of the total number of sieges is represented by our sample. And second, there is the historical flaw, that we cannot guarantee the accuracy of data which has been transmitted through the filter of intermediary authorities, most of whom were not even eye-witnesses to the events which they describe. Of course, this second point highlights a problem that afflicts all historical enquiry, just as the first point highlights a general problem of statistical analysis. Both must be allowed for, when assessing the results.

Forty-two of the sieges, which is rather less than one-quarter, involved the use of perimeter earthworks. This category runs the entire gamut from elaborate systems, such as Caesar's "bicircumvallation" at Alesia, to simple encirclements, like Metellus's ditch and palisade at Thala, and obstructions, like Cassius's blockading wall at Laodicea. It also includes four putative encirclements, where, because of the vagueness of our sources, it is not certain that a circumvallation existed (nos. 42, 68, 115, and 193), and two harbour moles (nos. 138 and 211). Excluding these leaves only thirty-six cases of encirclement (19%). It is instructive to note that Caesar and his associates were responsible for eleven of these, which is a massively disproportionate percentage of contemporary sieges; by contrast, the use of circumvallation during the period of the Spanish Wars (ironically, the era of Numantia) falls to its lowest percentage.

Forty of the sieges, or a little over one-fifth, saw the erection of embankments. This category is also diverse, including under the same rubric operations like Titus's assault on Jerusalem, which involved several ramps of major proportions, and others like Cor-

bulo's assault on Legerda, which was on a far smaller scale. It also includes the embankment at Uxellodunum, which was never intended to facilitate a direct assault, and the timber structure depicted at Sarmizegethusa on Trajan's Column, which I have tentatively interpreted as an embankment (see above, p. 70). Excluding these leaves thirty-eight operations involving embankments (20%). Although the largest concentration, with nine embankments, is found in the Caesarian period, this represents only one-third of that grouping; the largest proportion of contemporary sieges (six out of fifteen, 40%) falls in the Jewish War period.

Of all the statistical analyses that could be performed, one is particularly relevant, in testing the supposed Roman predilection for blockade over assault. A blockading strategy was followed in forty-one, over one-fifth, of the sieges (although five are uncertain – nos. 79, 81, 115, 140, and 166 –, and two ended in an assault – nos. 87 and 91 –, making thirty-four definite cases), whereas a storming assault was successfully carried out in seventy-two, or two-fifths. In addition, only half of the sixty-four surrenders reflect a successful blockade, the remainder resulting from assault, or fear of assault; this is particularly noticeable during the Spanish Wars (five out of six surrenders: Table 5, p. 40), but is also apparent during the Macedonian Wars (eight out of ten surrenders: Table 4, p. 33) and during the Caesarian period (seven out of ten surrenders: Table 8, p. 55). This conclusively demonstrates that, on the whole, the Romans preferred to pursue a siege actively, rather than passively waiting for surrender.

Data table:		2	3	-	4	5	-	6	7	8	9	10	11	12	13	14	188 sieges	
	investing works constructed	3	2	0	2	1	1	1	4	12	7	2	3	2	1	1	42	22%
	cordon thrown around town	0	0	0	5	3	0	1	0	0	0	1	1	0	2	3	16	9%
	assault ramp(s) constructed	0	1	0	3	2	1	2	4	9	5	2	6	1	1	3	40	21%
	blockading strategy	2	4	0	2	3	1	0	5	9	5	2	0	2	2	4	41	22%
	siege abandoned	0	2	0	3	4	1	2	2	8	3	1	2	3	3	2	36	19%
	town undefended / abandoned	2	0	0	0	0	0	0	1	0	0	0	2	0	0	2	7	4%
	town surrendered	2	5	0	10	6	0	0	4	10	5	5	1	3	4	7	62	33%
	town delivered by treachery	0	1	0	2	0	0	0	2	1	2	0	0	0	1	0	9	5%
	mass suicide / last stand	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2	1%
	town stormed	3	8	1	9	4	1	4	6	7	6	4	10	5	0	4	72	38%
	- wall breached	2	0	?	10	1	0	1	2	1	2	0	4	2	0	2	27	14%
	- gate forced	0	5	?	1	0	0	1	0	2	1	1	4	0	0	0	15	8%
	- escalate	1	8	?	9	4	1	0	4	3	2	4	3	0	0	0	39	21%
	- unopposed entry/open gate	3	2	?	1	0	0	3	1	1	1	0	2	0	0	0	14	7%
	- wall crossed	0	0	?	0	0	0	0	0	1	0	0	2	0	0	0	3	2%
	- wall undermined	0	0	?	1	0	0	1	2	0	0	2	3	0	0	0	9	5%
	- tunnel	0	0	?	1	0	0	0	2	0	0	0	0	0	0	1	4	2%

Table 15: Roman sieges - consolidated figures

Part 2:

The Archaeology of Roman Siegecraft

It is often assumed that the prosecution of a siege must have entailed construction work on an enormous scale and, consequently, will have left abundant archaeological traces. This assumption is implicit in those accounts which emphasize siege-works as a necessary component of siegecraft (e.g., Goldsworthy 2000, 145-146), but is frequently stated explicitly, for example by the excavator of Narbata, who claimed to have found “the three typical elements of a Roman siege: wall, camps and embankment” (Zertal 1981, 114).

Although I have demonstrated, in part 1, that ramps and circumvallations were by no means the norm (above, pp. 80f.), it is clear that siegecraft often entailed construction work. Indeed, in several instances, we are fortunate enough to have material remains of historically attested sieges, thus allowing a critical comparison of the literary and archaeological evidence. In the following three chapters, I present an analysis of each of Zertal’s “typical elements”, integrating the archaeological record with the evidence of the ancient sources.

Chapter 2: *The Encampments*

It was commonplace for a campaigning army to fortify a camp after a day's march (e.g., Frere & St. Joseph 1983, 19-20). This was not a matter of choice, but of routine: for example, in the vicinity of Cyzicus in 74 B.C., after pursuing Mithridates well into the evening, Lucullus still expected his troops to build a camp, although it was now dark (Plut., *Luc.* 9.2). Consequently, it is not surprising to find besieging armies providing themselves with similar accommodation. Camps are explicitly mentioned at fifty-two Roman sieges (see Table 16, p. 85), and it seems reasonable to assume that, in most cases, the besieging general's first act was to provide secure accommodation for his army.

With this in mind, it is interesting to note that Liebenam defines a category of sieges which he calls the "violent assault" (1909, 2236: "gewaltsamen Angriff"), or *repentina oppugnatio*, characterised by lack of preparation (1909, 2239: "ohne längere Vorbereitung"). Veith, in fact, had already utilised this category in his discussion of Caesarian siegecraft, prescribing such an attack against weak or poorly defended sites which might, in any case, be intimidated by the very appearance of the army (1906, 54-55); in a later reworking of the idea, perhaps influenced by Liebenam, he calls particular attention to the absence of apparatus (1928, 446: "Wegfall aller jener Angriffsmittel"). Described in those terms, it is tempting to assume that such a "sudden assault", mounted *ex itinere*, must have dispensed with the formalities of entrenching.

	Cat. No.	Comment
Agrigentum	38	Two camps established.
Lilybaeum	44	Two camps established.
Casilinum	48	
Syracuse	50	Camp to north; fleet on eastern seaboard.
Arpi	51	
Capua	53	Three camps established.
Cartagena	55	Camp commanding narrow approach.
Orongis	57	
Castax/Castulo	59	
Utica	64	
Amphissa	81	
Ambracia	83	Two camps and a fort established.
Delminium	91	Romans attacked while encamping.
Cauca	93	
Carthage	95	Two camps, later reduced to one.
Numantia	98	Romans take refuge from marauding Numantines in the camp.
Numantia	102	Two camps established.
Suthul	103	
Zama	104	
Heraclea Pontica	117	
Jerusalem	122	Camp to the north of Temple; second camp possibly to south-west.
Solonium	123	
Noviodunum	124	
Cenabum	131	
Avaricum	132	
Gergovia	133	
Alesia	134	
Uxellodunum	135	Three camps established.
Pindenissus	136	More than one camp, plus six forts.
Corfinium	137	Two camps established.
Massilia	138	
Utica	139	
Salonae	140	Five camps established.
Dyrrachium	143	Caesar encamps between Pompey and Pompey's supply base.
Gomphi	144	
Ulia	146	
Thapsus	147	
Ategua	149	
Mutina	150	
Perusia	155	
Brundisium	156	
Jerusalem	159	Camp to the north of Temple.
Mons Haemus	170	
Jerusalem	176	Camp on Mount Scopus.
Jotapata	180	
Tarichaeae	182	
Gamala	183	
Jerusalem	189	Camp on Mount Scopus replaced by three camps around city.
Masada	191	
Aquileia	203	
Bezabde	217	
Maiozamalcha	223	

Table 16: Roman camps explicitly mentioned at sieges

Ironically, the term *repentina oppugnatio* derives from Caesar's siege of Gomphi, where his first act was to build a camp before the town, and his second to construct ladders, shelters and screens (Caes., *Bell. Civ.* 3.80.5). The assault, when it came, may have been swift, but the preparations were thorough. Liebenam also adduces the example of Noviodunum, where Caesar decided against an immediate assault, on account of the scale of the defences, and encamped instead, ordering the construction of siege apparatus (Caes., *Bell. Gall.* 2.12). Crassus's siege of the Sotiates is cited as a third example, but here, not only were shelters constructed, but siege-towers and an embankment, too; it is unthinkable that such preparations would have been under way while the army remained unentrenched, and it is questionable whether such an operation qualifies for the term *repentina*, in any case. Perhaps the only legitimate contender for the title of "sudden attack" is found during Caesar's second invasion of Britain, when his legionaries assaulted a *locus munitus*, before entrenching (Caes., *Bell. Gall.* 5.9; the site is thought to be Bigbury in Kent: Todd 1981, 21).

In many cases, the army was initially encamped some way off, no doubt to maintain secrecy and security. Thus, in 262 B.C., the first camp at Agrigentum lay a mile (1½ km) from the town, and, in 213 B.C., Marcellus encamped a mile-and-a-half (2¼ km) from Syracuse; when his assaults proved unsuccessful, he withdrew to a distance of five miles (7½ km) for the winter. Similarly, at Utica in 204 B.C., Scipio Africanus established his first position on high ground a mile (1½ km) from the town, and withdrew to the more distant *castra Cornelianiana* for winter. Vespasian initially encamped seven stades (1¼ km) from Jotapata, but made sure he could be seen from the town, in order to intimidate the inhabitants. Roman operations at Jerusalem in the mid-first century began with an encampment on Mount Scopus, seven stades (1¼ km) to the north, from where, after suitable reconnaissance, the army advanced into the city, along a route dictated by the topography (cf. nos. 176, 189); it may reasonably be suggested that earlier operations (e.g., nos. 122, 159) followed the same pattern. Unfortunately, we have no archaeological evidence for any of these.

Reconnaissance was vital in advance of any military action (cf. Elton 1996, 248-250; Goldsworthy 1996, 125-131). Both Corbulo and Lucilius Bassus are said to have re-

connoitred, respectively, Volandum and Machaerus, before planning the assault; Trajan was almost shot while doing the same at Hatra; and the value of the practice was still appreciated in later times, to judge from the reconnaissance of Bezabde by Constantius in A.D. 360, and of Pirisabora, Maiozamalcha, and the fort near Seleucia by Julian in A.D. 363.

En route to Jerusalem in A.D. 70, Titus halted his main force 30 stades (5½ km) away, and led a cavalry reconnaissance of the city. In the previous year, Antonius Primus had explained the importance of such a precaution to his over-eager troops, arriving by night at Cremona. The point of his lecture, in which he emphasized forward-planning, deliberation and delay (Tac., *Hist.* 3.20), was graphically confirmed when his cavalry scouts brought news of an impending nocturnal counter-attack, known to us as the Second Battle of Cremona. Caesar's reconnoitring of Gergovia had less dramatic results, but was no less necessary: having obtained a clear idea of the town's situation, he decided that the approaches were too difficult for an immediate attack, and encamped the troops about 2½ km from the town, while he turned to the business of securing his supply lines. And, when Postumius Megellus approached Feritrum in 294 B.C., he sent cavalry ahead, admittedly because he mistrusted the silence of the town and feared a trap.

Once the army moved up to begin besieging operations, it was important to achieve maximum visibility of the entire town circuit. In the case of large towns, this will have meant establishing two or more camps, ideally maintaining a watch on opposite sides. Two camps were established at both Agrigentum and Lilybaeum, during the First Punic War, and at Numantia in 133 B.C. Schulten has stated emphatically that such camps should be diametrically opposite each other (1927, 23: "die beiden Lager womöglich diametral gegenüberliegen"), no doubt influenced by his interpretation of Numantia (see below, p. 101); but there are good reasons to believe that the camps at Agrigentum were to west and south (Polybius, 1.18.2, mentions the Heraclea gate and the Asclepium: cf. fig. 1), while topography would suggest north-east and south-east at Lilybaeum (fig. 2). In fact, from a strategic standpoint, it would have been more important to cover the principal gates of the town, than to ensure symmetry between the camps (cf. Garlan 1974, 107).

When Caesar encamped before Corfinium in 49 B.C., he waited for reinforcements to arrive, in order to establish a second camp on the other side of the town. During the Second Punic War, Capua was surrounded by three camps, though this was primarily because three army groups were involved. On the other hand, strategic concerns probably dictated the establishment of two camps and a *castellum*, strung out along the only accessible side of Ambracia in 189 B.C. (fig. 7). Maintaining surveillance was certainly the reason for the three camps around Uxellodunum in 51 B.C. (fig. 15).

At Jerusalem, both Pompey in 63 B.C. and Sosius in 37 B.C. (and probably Cestius Gallus in A.D. 66, as well) encamped within the city, to the north of the Temple enclosure, which was always the centre of rebellion, but in A.D. 70, Titus was more cautious; while his main force encamped in the northern suburbs, he maintained two other camps, on the Mount of Olives to the east and on the level ground to the west (cf. fig. 22). However, Octavius, in 48 B.C., must have felt particularly insecure to surround Salonae with five camps; in fact, his concerns were justified, when his troops' lack of vigilance cost him victory.

In some cases, where a town's location was naturally restricted, only one camp was required. A prime example is Cartagena (fig. 4), where salt flats flanking the town created a virtual promontory, so that Scipio needed only to encamp to the north-east to command the access route. Similarly, at Utica (fig. 5), a single camp was sufficient to watch the approaches to the town, and at Avaricum (fig. 11), the marshy terrain left only one suitable site for Caesar's camp. The case of Carthage (fig. 8) is interesting, where the two consuls initially established their camps on the narrow isthmus facing the city. But, in a clear failure of reconnaissance (and a violation of the rule, that a salubrious site is required for a long stay: Vegetius, *de re mil.* 1.22), one of the camps was sited too near the stagnant Lake of Tunis, and had to be moved up to the sea coast when the men began to fall ill. When command passed to Scipio Aemilianus, he established a single camp on the isthmus. In general, at smaller towns, the army appears to have been concentrated in a single camp. At Arpi in 213 B.C., for example, this was located half-a-mile ($\frac{3}{4}$ km) from the town, to enable a *coup de main*.

We are reliant on topographical study to suggest the likely locations for most of these encampments (e.g., Veith 1913). However, archaeology furnishes two particular examples where the remains of camps have been interpreted as relating to otherwise unattested siege operations.

1. Nahal Hever (Israel)

Aharoni has claimed the discovery of siege-camps at the Nahal Hever gorge, in the Judean desert of Israel, where rebels of the Second Jewish War period (cf. Bettir, no. 197) took refuge in caves cut into the precipitous cliff-sides (Aharoni 1993, 827-829). On the cliff-tops above were sited two small Roman camps, one on either side, so that each lay directly above one cave and opposite another. "It is thus obvious", writes Aharoni (1993, 827), "that the Roman camps were established in order to lay siege to the cave below them and at the same time to observe the cave opposite ... (because) the caves' entrances are observable only from the opposite cliff."

Both camps were protected by metre-thick dry-stone walls on three sides, and open to the precipice on the fourth. The north camp (fig. 30), situated above the so-called Cave of the Letters and opposite the Cave of Horrors, was investigated by Yadin (1963, 11-14). The tiny enclosure (c. 0.125 ha) compares favourably with the class of Roman fortifications known as fortlets, and could have accommodated a *centuria* of troops (Yadin suggests 80-100 men). Fortlets are known to have been linked to patrolling (cf. Frere & St Joseph 1983, 135), which was presumably the function of the camps at Nahal Hever, where the rebels occupied another three caves besides the immediately adjacent examples. The camp's internal buildings (Structures 5 and 10) form a jumble, which is quite unlike the regular barrack-blocks found in fortlets in the west (cf. Breeze 1977, 2), but Structure 1 may well have been the headquarters.

As far as the defences are concerned, Yadin considered the "bastion" in the north-east corner to have been "a means of observation" (by which he presumably means observation of the northern hinterland), and further suggested its involvement in the provision of "flanking fire to the east and the north" (1963, 13). This may safely be discounted, on the grounds that a structure positioned here does not command a clear line of sight

along either adjacent side. But Yadin's description of the single clavicular entrance (Structure 7), midway along the western rampart, as "a round tower ... providing an additional means of cross-fire along the eastern section of the northern wall" (*ibid.*), is a curious description of what was simply a gateway.

Whether the military operation at Nahal Hever falls within the remit of siegecraft is debatable. In the absence of literary evidence, we do not know how the Romans viewed the situation. Yadin noted that the camps were situated to give maximal coverage of the paths leading to and from the caves below, and, given that escape to the wadi floor from the caves was "virtually impossible" (Yadin 1963, 14), he plainly viewed the deployment of troops here as a type of blockade. Of course, an alternative strategy is equally credible, based not on blocking the access paths, but on utilising them as avenues of assault. However, the fact that no signs of violence have been noticed in the caves must weigh heavily against this theory.

2. Burnswark (Scotland)

A different type of debate has raged over Burnswark, where the native hill-fort is flanked to the north and south by two Roman camps (fig. 31). The camps' involvement in siegecraft is not disputed; however, generations of scholars have argued over whether the siege was genuine, or simply a practice exercise. The debate only arises through analogy with a peculiar class of fortifications known as "practice camps", but these are so designated on account of their unsuitability for use as marching camps (Frere & St Joseph 1983, 136-137; cf. Richmond 1955, 302-303); no one would claim that the camps at Burnswark were unsuitable for siegecraft.

Nevertheless, the provision of two camps has been thought by some to be excessive for the reduction of a hillfort (R.C.A.H.M.S. 1920, 97), and the employment of "heavy siege-artillery", suggested by the recovery of eleven *ballista* balls and fragments of another nine (Christison *et al.* 1898/99, 245-246), attracted criticism as "a remarkably powerful sledge-hammer to crush a nut" (Davies 1972, 106). Finally, excavation of the hillfort defences, opposite the western gate of the south Roman camp, yielded evidence that the timber-palisaded rampart had already collapsed by the time of the Roman at-

tack: “a number of Roman sling-bullets and arrowheads were recovered from directly on top of the surface of the rampart”, whereas “none were found within or beneath the forward tumble” (Jobey 1977/78, 67). Consequently, the camps have been re-interpreted as “almost certainly constructed by the army on manoeuvres” (R.C.A.H.M.S. 1997, 179).

However, the evidence from the hillfort defences is fragile, given that excavation was limited to a 2-metre trench across the southern rampart and a re-investigation of the 19th century trenches at the West and Central Gates (the plan suggests areas of around 16 × 10 metres and 10 × 5 metres, respectively). The original gateways were buried by a metre of rampart collapse, and overlain by a pavement of slabs; as the slabs were undisturbed by the earlier excavations (cf. Christison *et al.* 1898/99, 239-240), Jobey concluded that the Roman projectiles recovered in 1898 originated from this later phase (Jobey 1977/78, 71). Occupation debris from within the hillfort includes pottery of the first half of the second century (Jobey 1977/78, 84-85), but a sling-bullet found on the cobbled surface of a domestic floor was felt to be “hardly sufficiently strong evidence that such a house had been the target for assault” (Jobey 1977/78, 78-79).

Throughout his report, the excavator is at pains to support the “practice siege” interpretation, but, in the final analysis, can muster only the weak arguments that the Roman camps seem excessively large for the capture of a native stronghold, that there may have been “more than a very temporary occupation” of the south camp, and that the Roman works do not deny the inhabitants access to a water supply (Jobey 1977/78, 98-99). But previous commentators were satisfied that a siege had occurred at Burnswark. Collingwood, for example, stated that “the siege theory gives the only possible explanation of the camps and their relation to the hill-fort” (1925/26, 47-48). It is worth, then, examining the evidence of the camps themselves.

The camp lying to the north of the hillfort, enclosing 2.5 ha, has been declared incomplete (e.g., Birley 1939, 316), because a 60-metre length of the north-west rampart remains open. For Collingwood, here was evidence “that the purpose for which it was designed had been accomplished before it was more than half-finished” (1925/26, 57).

He also attributed its irregular shape to the fact that “the work may have been done under fire” (*ibid.*), while acknowledging that, on occasion, the Romans were capable of remarkable inaccuracy in laying out earthworks (1925/26, 51). It is perhaps relevant, however, that the unfinished stretch lies in an area of boggy ground (R.C.A.H.M.S. 1997, 181), and perhaps only ever existed as a palisade line.

Most attention has been paid to the southern camp, a 5 ha enclosure incorporating a pre-existing Antonine fortlet in its north corner (Jobey 1977/78, 79-80). The camp’s peculiarity lies in the uneven distribution of gates, with three facing the hillfort but only one on each of the remaining sides, and on the singular nature of the northern gate defences. Whereas the other three gates are covered by traverses of more-or-less traditional form, the northern gates are fronted by the so-called “Three Brethren”, mounds of such imposing scale that Barbour called them “towers” (Christison *et al.* 1898/99, 227). Excavation showed that the central mound was broadly circular, with a base diameter of over 15 m, and stood 3.2 m above the bottom of its ditch, whereas the eastern mound, which Barbour claimed to be “similar”, was plainly oval (as can be seen on Barbour’s plan). Eschewing any discussion of their function, he simply assumed that they had been adapted “to the particular circumstances of the situation” (*ibid.*).

In fact, they are only the most obvious of several idiosyncrasies in the construction of this camp. For example, the ramparts are unusually massive, but this has been explained by reference to the fact that they were intended for more than overnight accommodation (Collingwood 1925/26, 56, coining the term ‘semi-permanent’). Jobey noted the presence of fragmentary rock in the upper levels of the rampart (Jobey 1977/78, 81), which Barbour had previously interpreted as a deliberately-laid stone capping (Christison *et al.* 1898/99, 224-225). It seems that, in the course of construction, the builders frequently cut into the rock (cf. Christison *et al.* 1898/99, plate V, fig. 1), which naturally presented itself in the final layers of upcast; here, then, is the solution to Davies’s problem of “why the Romans used so much stone in building these two camps” (Davies 1972, 102). Clearly, little importance can be attached to the same phenomenon occurring within the traverses (*pace* R.C.A.H.M.S. 1920, 99). Nor are the “Three Brethren” the only peculiar traverses. The south gate apparently had a crescentic traverse

(Collingwood 1925/26, 53 note), while that covering the east gate was 15 m long (i.e., the same as the central and eastern “Brethren”) and rose 2.75 m above its ditch (i.e., not much lower than the central “Brother”).

A misinterpretation of Barbour’s reference to towers is perhaps at the root of Schulten’s theory that “these mounds supported wooden towers from which an enemy storming the camp could be shot most effectively” (Schulten 1914, 613: “diese Hügel hölzerne Türme getragen haben ...”); this would be a most unorthodox, and unnecessary, use of this standard feature of camp construction. Collingwood subsequently pronounced them “inexplicable as ordinary traverses”, on the basis that “their shape and size render(ed) them quite unsuitable for defensive infantry tactics” (1925/26, 52). However, the *titulum*, lying across the front of an open entrance, is usually explained as an obstacle “intended to break up a direct charge” (Frere & St. Joseph 1983, 19; cf. Le Bohec 1989, 140: “situé .. de façon à briser l’élan d’un assaut”); the “Three Brethren” are perfectly suited to this function.

Whatever “defensive infantry tactics” Collingwood envisaged for *titula*, he decided that the “Three Brethren” were “highly suitable as emplacements for artillery”, devising the mistaken rule that “if they [viz. the platforms] are designed for bombarding a hostile position it is desirable to push them forward and raise them up as far as possible” (1925/26, 52); the same logic was applied to the clavicular gateway of the north camp. This theory will be examined below (p. 183). Here, it is sufficient to note that it has achieved general, and uncritical, acceptance (Birley 1939, 316; Davies 1972, 100; Frere & St. Joseph 1983, 33; R.C.A.H.M.S. 1997, 181).

The “practice siege” theory is underpinned by the fact that the south camp post-dates the Antonine fortlet (confirmed by Jobey 1977/78, 79-80), and thus the conjecture that the hillfort must by then have been derelict (Davies 1972, 106-107: “a police post as small as this would never have been constructed before the hill-fort had been captured and put out of action”). However, this objection was already addressed by Birley, postulating “a change of attitude on the part of the townsmen”, tentatively linked with destruction at the nearby fort of Birrens around A.D. 158 (1939, 316-317; cf. 1946/47, 148-149), and

Keppie has widened the chronological possibilities to allow for “recalcitrant elements” retreating to their former stronghold even as late as Severan times (1989, 67).

In fact, many of the objections to a genuine siege may also be raised against the theory of a long-standing training area. The rocky upcast, which Davies disingenuously describes as the Romans’ having “chosen to use stone extensively” (1972, 102-103), has been mentioned above; but, in a facility intended to be visited and revisited over the course of decades, one might have expected traces of buildings, rather than the single “area of paving” near the centre of the south camp (Jobey 1977/78, 82). Davies considers it “extremely doubtful if the Romans would have needed to build any camp at all to capture the fort” (1972, 106); by the same token, it is more than a little odd that accommodation was provided for such a large contingent of troops, if the sole purpose of their visit was to practise with four *ballistae*. And Jobey has made the perceptive point that, if it were an “artillery school”, one might have expected spent ammunition to be collected after use (Jobey 1977/78, 99).

On balance, it seems legitimate to enrol Burnswark amongst those sites besieged by a pair of camps, like Agrigentum, Lilybaeum, Corfinium, and the primary phase of Numantia (discussed further below, p. 101), though the dating remains elusive. Other sites have yielded evidence of camps in conjunction with a circumvallation, and these will be considered in the following chapter.

Chapter 3: *The Circumvallation*

When M. Licinius Crassus had run the remnants of Spartacus's slave army to ground in Bruttium in 71 B.C., he thought nothing of confining them there by walling off the Rhegium peninsula. His soldiers cut a 15-foot (4.6 m) ditch, three hundred stades (55½ km) long, from one coast to the other, backed by a wall and palisade (Plut., *Crassus* 10.7-8; Appian, *Bell. Civ.* 1.118-119). Plutarch says that Crassus did this "in order to keep the soldiers busy and deprive the enemy of supplies"; at any rate, it is a striking illustration of the Roman soldier's capacity for work, and a reminder that, in the hands of an imaginative commander, standard entrenching techniques could be adapted to meet the demands of a particular situation.

The confining of an opponent behind a fortified barrier is often found in the field of siegecraft. In many cases, the encampments accommodating the besieging force were supplemented by intermediate guard posts, which in turn were linked by a continuous barrier of some kind (see Table 17, p. 96). Vegetius describes the barrier in the following terms: "The besiegers make a ditch (*fossa*), beyond the range of missiles, and furnish it not only with a rampart (*vallum*) and palisade (*sudes*) but also with turrets (*turricules*), so that they can withstand sorties from the town; they call such a work (*opus*) a *loricula*" (Veg., *Epit. rei mil.* 4.28). (*Loricula* is found elsewhere specifying the breastwork on top of a *vallum*: *Bell. Gall.* 8.9.)

	Cat. No.	Comment
Agrigentum	38	Two lines of ditches linking two camps
Panormus	42	Possible ditch and palisade
Lilybaeum	44	Ditch and palisade
Capua	53	Double ditch and palisade with forts: "bicircumvallation"
Locri	56	Possible (opera): cf. p. 98
Orongis	57	Double ditch and palisade
Oreus	68	Probable (opera): cf. p. 98
Ambracia	83	Ditch and palisade with two camps and a fort (munimenta)
Carthage	95	Double ditch, palisade and wall: cf. p. 100
Numantia	102	Stone wall with seven forts
Thala	106	Ditch and palisade
Athens	112	Ditch
Praeneste	113	Wall and ditches
Isaura Vetus	115	Possible (munitio): cf. p. 44
Tigranocerta	120	Ditch
Atuatuci	126	Palisade and forts
Vellaunodunum	130	Unspecified
Alesia	134	Double ditch and palisade with forts (munitio): "bicircumvallation"
Uxellodunum	135	Palisade and forts (munitiones)
Pindenissus	136	Ditch and palisade with camps and forts
Corfinium	137	Palisade and forts (opera)
Brundisium	138	Harbour barrier
Utica	140	Palisade
Dyrrachium	143	Ditch and palisade with forts (munitio)
Ulia	146	Unspecified barrier (opera) with forts (munitio)
Thapsus	147	Unspecified barrier (opera) with garrisons and a fort
Ategua	149	Palisade/earthworks (bracchia) with a camp and forts
Mutina	150	Ditches and walls
Laodicea	152	Barrier wall
Perusia	155	Ditch and rampart with towers: "bicircumvallation"
Brundisium	156	Barrier ditch and palisade
Segesta	162	Ditch and palisade
Promona	164	Unspecified barrier
Mons Medullius	166	Ditch
Mons Haemus	170	Ditch and palisade with garrisons
Cadra/Davara	171	Unspecified barrier (opera)
Jerusalem	189	Wall with forts
Machaerus	190	(Archaeological evidence of wall with forts: pp. 112ff.)
Masada	191	Wall with forts
Sarmizegethusa	193	Possible (sculptural evidence): cf. p. 70
Bettir	197	(Archaeological evidence of wall with camps: pp. 121f.)
Cremna	210	(Archaeological evidence of barrier wall: pp. 122ff.)
Gesoriacum	211	Harbour barrier

Table 17: Roman investing works explicitly mentioned at sieges

Gilliver has claimed (1999, 149) that Apollodorus of Damascus, Trajan's engineer, included a discussion of circumvallation in his *Poliorkētika*, but the passage which she cites is expressly devoted to dealing with defenders who roll large objects downhill towards the besiegers. Apollodorus recommends "digging oblique ditches, with a depth of 5 feet (1.48 m), whose spoil forms a vertical wall, against which the rolling objects crash, in order to hold them off, and those coming up (from behind?) stand firm behind the shield (i.e., the rampart). Those digging are furnished with protection in front of the ditch, in which palings are set fast, lying at the same (oblique) angle, and boards are fastened (to them) and woven branches are wrapped around (them), so that it becomes an outwork (*proteichisma*) against the (objects) thrown against (it)" (Apoll. W 140). This is a peculiar arrangement, designed to meet a particular circumstance, and can in no way be interpreted as a circumvallation.

Fortunately, there are many other examples. Cicero describes how he surrounded Pindenissus with a ditch and palisade (*vallum et fossa*), incorporating six forts (*castella*) and several "large camps" (*castra maxima*). The Roman works at Ambracia comprised two camps (*castra*) and a fort (*castellum*), all three linked by a palisade and ditch (*vallum atque fossa*) which, judging by the topography, ran in a straight line, cutting off the only accessible side of the town (fig. 7); Livy refers to the entire system as *munitimenta*, "fortifications". The siege-works (*opera*) around Uxellodunum comprised three camps (*castra*) (fig. 15), supplemented by an unspecified number of forts (*castella*), all of which were linked by an encircling palisade (*vallum*). A similar system was established at Capua, comprising three camps (*castra*) supplemented by forts (*castella*) evenly spaced around the town, all linked by a ditch and palisade (*fossa vallumque*); Appian implies that the same arrangement also faced outwards, but it was probably just the barrier that was doubled (Livy's *duplex fossa vallumque*). Again, at Corfinium, once the two camps (*castra*) had been established, Caesar encircled the town with a *circummunitio*, "surrounding fortification", comprising forts (*castella*) and a palisade (*vallum*); the system was collectively termed an *opus*, "work".

It is often assumed, in the context of siegecraft, that the term "works" (*opera*, and its Greek equivalent *erga*) will refer to "siege-works". This is certain in the case of Uxel-

Iodunum, just mentioned, where, once Caninius asserted Roman dominance, he proceeded with construction of *opera* around the town (*Bell. Gall.* 8.37); the entire passage uses the terms *opera* and *munitiones* interchangeably (cf. *Bell. Gall.* 8.34). Other cases are less certain. Ambracia presents an interesting combination of *munimenta quibus saepienda urbs erat* (i.e., the siege-works) and *opera quae (consul) admovere muris parabat* (i.e., the siege machinery) (Livy 38.5.1). Livy goes on to explain where the individual *opera* were deployed, and the corresponding passage of Polybius refers to advancing *erga* (Polyb. 21.27.2); both clearly indicate machinery in this context, and not earthworks, proving that caution should be exercised in interpreting these terms (cf. Walsh 1993, 128).

Doubt remains about the situation at Locri (above, p. 24), which Cincius Alimentus besieged *operibus tormentorumque omni genere* (Livy 27.28.13); juxtaposed with artillery, the *opera* may well have been siege-machinery. The *opera* which Flamininus burned before withdrawing from Corinth are likely to have been the embankments which he had raised, though the passage also mentions battering-rams, and we have seen that *opera* could embrace machinery. Sometimes, the context betrays the meaning. The troops left at Oreus *ad opera perficienda* (Livy 31.46.12) are likely to have been digging the siege-works which are later stated to lie *circa Oreum* (Livy 31.46.14). However, the walls of Eretria were destroyed by *opera*, newly constructed from timber felled in the neighbourhood (Livy 32.16.10-11); these, and the *opera ad oppugnationem* at Meliboea, are likely to have been siege-machines (above, p. 30). Similarly, when Sempronius Gracchus *opera admoveret* against Certima (above, p. 34), we should envisage machines of some kind.

Turning to a different element of terminology, Schulten considered it likely that the term *castrum* (or its Greek equivalent, *stratopedon*) was applied to the primary fortification (or fortifications) on the site, emphasizing either the camp's independence or its importance as the fulcrum around which any subsequent system would operate. If there were any secondary encampments, established in support of the main camp or camps, these would then be termed *castella* (or *phrouria*, in Greek), in view of their subordinate function, and not necessarily on account of smaller size. The important point was

that these “*castra minora*” were not independent, but relied on a lateral barrier to link them into a system (Schulten 1927, 20).

The ditch-and-palisade is undoubtedly the most common form of barrier encountered in Roman investing works (cf. Table 17, p. 96). Occasionally, a solitary ditch is mentioned, as at Athens or Tigranocerta, but the excavated material was no doubt piled up to form a rampart, which we may expect to have been crowned by a palisade; a ditch on its own, even a substantial one, would not have formed a particularly secure barrier, although it would have served to apply the psychological pressure of containment (as suggested above, pp. 23f., 30f., 49). Besides the camps and forts, the line could be further strengthened by a system of closely-spaced turrets. This high degree of security is found at Perugia, where the 56-stade (10½ km) ditch and palisade was studded with towers every 60 feet (18.5 m); however, even if we assume that the width of each tower was included in the 60-foot space allowance, there would have been room for fewer than 600 towers, a far cry from Appian’s reported 1,500 (App., *Bell. Civ.* 5.33). The system was further elaborated to face outwards, thus qualifying it as one of Connolly’s “bicircumvallations” (above, p. 36), and was connected with the Tiber by off-shoots, which Appian calls “legs” (*skelē*) and explains as a measure to prevent supplies from getting through to the town; however, it seems more likely that they were designed to safeguard Octavian’s own supply-lines to the river.

Schulten was of the opinion that the individual lengths of barrier were termed *bracchia*, or “arms” (Schulten 1927, 15-16: “Die Stücke der Circumvallation, welche die Lager verbinden, heißen *bracchia*”; cf. Liebenam 1909, 2236: “Zwischenwälle”). But this is more problematic. In fact, *bracchium* (and its Greek equivalent, *skelos*, a “leg”), indicates any length of wall, and is not specifically linked to siegecraft; the two words are used, for example, to describe the Long Walls of Athens (Livy 31.26.8; Diod. Sic. 13.107).

In a military context, *bracchia* usually serve as independent walls of confinement. For example, in 85 B.C., Fimbria lured the Pontic cavalry between a pair of “arms”, and slaughtered them while they were trapped there (Front., *Strat.* 3.17.5); or again, in 216

B.C., Hannibal denied a small beleaguered Roman camp access to the nearby river by constructing a lateral “arm” (Livy 22.52.1). The same sense of confinement is conveyed by Caesar’s parallel *bracchia* at Uzitta in 46 B.C., except that it was his own troops who were hemmed in, in order to protect their flanks (*Bell. Afr.* 51; 56); the word is used earlier by the same author to describe a linear fortification, gradually linking a progression of turrets and forts (*Bell. Afr.* 38; 49). In 45 B.C., near Ategua, both Cn. Pompeius and Caesar built single *bracchia* to link their respective camps to the nearby River Salsum (*Bell. Hisp.* 13; 23); but, only at Ategua itself, do we find the word used to describe the siege-works (*munitiones*), when Caesar “*bracchia circumducere coepit*” (*Bell. Hisp.* 6).

Such *bracchia* were no doubt earthen ramparts, probably with a palisade; at any rate, Dio refers to a palisade at Ategua (43.33.2; 34.3). A further variation in circumvallation design saw the palisade replaced by a dry-stone construction. The isthmus at Laodicea was apparently sealed off by a stone wall, two stades (370 m) in length, and the circumvallation which Titus threw around Jerusalem took the form of a wall, 39 stades (7¼ km) long, connecting thirteen forts (*phrouria*). As we shall see, the barriers at Numantia, Machaerus, Masada, Nabata, Bettir and Cremna all took the form of a stone wall.

Carthage presents an unusual scheme of siege-works. According to Appian (*Pun.* 119), Scipio Aemilianus cut off the town with two 25-stade (4½ km) ditches, running across the isthmus (fig. 8), one at missile-range from the town and the other not far behind it, and connected at the ends; he fenced all of them with sharpened stakes and, in addition, he built a 12-foot wall facing the town, and again palisaded the other ditches. (It is often stated that the ditches were *filled* with stakes, e.g., Kern 1999, 293, but Appian only says that, “in addition to the stakes [or, perhaps, “behind the stakes”], he fenced the other ditches with a palisade”; i.e., the ditches other than the one in front, which had the stone wall.) Interval towers were added to the wall, and the halfway tower was heightened by a four-storey observation platform. Schulten was in no doubt that this construction should be considered as “a double line of investment”, on analogy with Alesia and Perugia (1933, 182-183: “eine doppelte Einschließungslinie”).

1. Numantia (Spain)

Scipio's later siege of Numantia (no. 102) betrays a number of similarities to his works at Carthage. Appian records that Scipio first established a camp in the vicinity of Numantia (*Hisp.* 87), before he and his brother, Fabius Maximus, moved up to the town. This is entirely consistent with the usual strategy, noted, for instance, at Jerusalem in A.D. 70 (above, p. 86), but this primary encampment has failed to provoke scholarly conjecture. The obvious candidate is camp IV at Renieblas, six kilometres from Numantia, which Schulten attributed to Pompeius's activities in 75 B.C. (1929, 144; cf. Keppie 1984, 73 and note 13, for reservations), but which has yielded no internal structures or dating evidence (cf. Salvatore 1996, 117). Ironically, Fabricius had already suggested that Scipio's siege headquarters lay at Renieblas (1911, 379), only to have Schulten dismiss this idea (1927, 16-17: "unmöglich"). However, at approximately 58 ha, the camp covers virtually the same area as the siege-camps combined, and would comfortably have accommodated Scipio's forces, prior to moving up to the town. (Interestingly, a long outwork extends to the nearby river from the north-west corner of the camp, and may legitimately be termed a *bracchium*.)

Having reconnoitred from afar, Scipio and Maximus then established two camps outside the town. Schulten conjectured, partly on topographical grounds but also because of the plentiful archaeological remains, that Scipio occupied the 7.35 ha camp at Castillejo, while his brother occupied the 11.2 ha camp at Peña Redonda (1927, 21-22) (fig. 9). The Romans clearly appreciated the strategic position of Castillejo, as two previous camps had lain there; in the absence of compelling evidence, Schulten suggested that one of these belonged to Q. Pompeius in 141-140 B.C. (no. 98), the other to an earlier visit by Claudius Marcellus (Schulten 1927, 172). Although Castillejo thus has a good claim to be the headquarters, there is no particular reason to place Fabius Maximus at Peña Redonda, and it must be suspected that it was the better preserved remains that led Schulten to emphasize this camp. A better candidate might be Dehesilla, whose size, at 14.6 ha, recommended it to Cheesman (1911, 181). It has the additional advantage that, where Peña Redonda's location is confined by the steep gorge of the Rio Merdancho, Dehesilla commands an altogether easier approach to Numantia, and is bet-

ter placed to oversee the western side of the town, whereas both Castillejo and Peña Redonda lie to the east.

According to Appian, Scipio then established seven forts (*phrouria*), a total that is correct, if it includes the two main bases; Florus (1.34) counted four camps, which is demonstrably wrong. Besides Castillejo, Peña Redonda, and Dehesilla, Schulten discovered another four, far less well-preserved camps. To the north-east of the town, the long, gentle slope, ideal for sorties, was obstructed at the north end by Castillejo, and at the south end by Valdevorron, a 9 ha camp positioned on a hill; between the two, on flat open ground, lay the 4 ha camp of Travesadas. Farther south, across the Merdancho, lay Peña Redonda, on a narrow spur projecting to within 500 metres of the town, but separated from it by the steep-sided river valley. The site's superior level of preservation is entirely due to its remoteness and inaccessibility, which suggests that, tactically, this was a defensive position, rather than a good jumping-off point; Scipio may have preferred to select a more accessible site for his brother's camp. At the southern end of Numantia lay the 6 ha camp of Raza, effectively the anchor of the eastern ring of camps. Across the Duero lay Dehesilla, commanding the western approaches to the town across the wide river valley, and hence arguably a more important position than Peña Redonda. Further north, a 5 ha camp at Alto Real, above the confluence of the Duero and Tero, completed the ring of seven camps. An eighth camp was identified at Molino, on the basis of a few barrack-like buildings; these, and some nondescript remains at Vega, were taken as evidence of controlled river-crossing points.

After the establishment of the camps, Appian records that the town was surrounded by a ditch and palisade, but Schulten was unable to find evidence of a ditch, and conjectured that the rivers fulfilled that role (1927, 27-28). In that case, there remains the unanswered problem of the north-eastern sector, where no river separated the camps from the town. It is notable that Scipio had arranged for each soldier to carry seven stakes (Livy, *per.* 57), no doubt so that the exposed sectors could immediately be palisaded, before troops had to be sent farther afield to collect more timber. After the erection of the palisade, Scipio then proceeded to circumvallate the town with a 50-stade (9¼ km) stone wall. We have seen that the ditch and palisade was the most common form of cir-

cumvallation (above, p. 99), but in a few cases it was only a preliminary stage, in order to protect the troops building the final stone wall. Scipio himself had followed this scheme at Carthage, Hannibal had done the same at Tarentum (Livy 25.11.1-20), and, perhaps the *locus classicus* for ancient siegecraft, the Spartan siege of Plataea in 429 B.C. had followed the same procedure (cf. Garland 1974, 114-117).

In tracing the circumvallation wall, Schulten found that it followed the high ground, set back between 100 and 200 metres from the rivers; but, on the northern and eastern stretches, where no river fronted the wall, it lay between 800 m (Valdevorron) and 1½ km (Castillejo) from the town. Schulten's claim that "the wall has been found over a large part of the circuit" (1927, 32: "Die Mauer ist auf einem großen Teile ihres Umkreises aufgefunden worden") is overly sanguine. In fact, he traced only a short stretch between Castillejo and Travesadas (1927, 70-73), another running up to Peña Redonda (1927, 76-77), and a more substantial length on either side of Dehesilla (1927, 73-76), in total approximately 1,680 metres of the estimated 9 km (1927, 79). It is worth noting the possibility that only parts of the circuit were built in stone, but this has not been tested archaeologically.

The individual stretches examined by Schulten revealed considerable variation in design. Between Dehesilla and Alto Real, the wall was approximately 3.50 m wide, comprising two faces (inner, towards Numantia: 1.10-1.20 m wide; outer: 0.50 m wide) and a rough, stony core (1.90-2.0 m wide) (Schulten 1927, 73). At one place, along the Castillejo-Travesadas stretch, only the 0.75 m limestone facing and a metre of rubble backing was found (Schulten 1927, 71); at another, the recovered width of 2.40 m was reckoned to accurately represent its original state (1927, 72). The Peña Redonda length was found to be of unusual construction: instead of two faces enclosing an inner core, there was an intermediate row of 0.40 m wide blocks, separating two lots of infill, 1.50-2.0 m wide; the entire wall was thus a massive four or five metres wide (1927, 77). A similar width was noted on the Dehesilla-Molino stretch (1927, 74). Summarising his findings, Schulten stated that the wall was, on average, four metres wide (1927, 82-83), as against Appian's statement that "he [viz. Scipio] built a wall, the width of which was eight feet

[= 2.47 m], and the height ten feet [3.10 m] minus the battlements" (*Hisp.* 90). However, the Castillejo sector, at least, may be said to conform to Appian's dimensions.

The Dehesilla-Alto Real sector provided details of an interval tower, which was found to be 2.20 × 2.10 m, with walls 0.50 m wide (Schulten 1927, 73). Another two, set back from the wall on the Dehesilla-Molino sector, were approximately 5.0 × 4.0 m, with walls 0.40 m wide (1927, 74), while four others were marked by post-holes, the front pair sunk into the core of the wall, the rear pair around 5 metres behind (1927, 75). Following Appian's description (*Hisp.* 92), Schulten believed that artillery would have been positioned at wall-walk level, allowing two catapults per tower, while an upper storey was used for signalling (1927, 85; cf. below, p. 180). However, the four towers are very closely spaced, at between five and eight metres, not the *plethron* (31 m) which Appian states (*Hisp.* 90), and there is no sign of a regular series continuing around the circumvallation. Nevertheless, artillery positioned here would have been well-placed to counter any sorties across the flat flood plain. Nor is there any evidence of Appian's alleged river-blocking measures (*Hisp.* 91), although at least the towers from which the spiked booms were suspended ought to have left some traces.

2. Alesia (France)

Quite a different situation obtained at Alesia (no. 134), where Caesar's elaborate "bicircumvallation" surrounded the plateau of Mont Auxois (fig. 13), in a topographical situation strikingly similar to Numantia. The earliest investigations, sponsored by Napoléon III (1866), concentrated on faithfully reconstructing Caesar's description of his siege-works. More recent archaeological work has modified the image of regularity and uniformity which Napoléon's publication suggests.

After reconnoitring, Caesar's first priority was to encamp at convenient places (Caes., *Bell. Gall.* 7.69), before setting about the construction of twenty-three *castella*. An emendation, specifying eight camps and twenty-three forts (e.g., Handford 1951, 190), was convincingly rejected by Holmes (1911, 805 n. 2), but Napoléon was surely under its influence when he established a sequence of eight camps (designated A to D, G to I, and K) and twenty-three (numbered) redoubts. Of the camps, Camp D has long been

doubted, owing to the absence of archaeological remains (Harmand 1967b, 215-217), and Camp I has been proven to be a post-Roman feature (Reddé *et al.* 1995, 123-124); of the forts, only five were based on traces on the ground (10, 11, 15, 18, and 22), the other eighteen conjectured entirely from topographical likelihood. However, the latest researches favour a total of six camps, established on the heights of the Montagne de Bussy (C, 15, and 18) and the Montagne de Flavigny (A, B, and 11), in order to command views over the Gallic *oppidum* (Bénard 1996, 48-49). Camps G, H, and K are now considered doubtful (*ibid.*: “suspecte”) as is fort 10 (Le Gall 1974, 467 n. 5), and fort 22 was long ago recognised as a prehistoric enclosure (Holmes 1911, 804 n. 6).

The camps are irregularly shaped, following the contours of their location, and vary widely in size. For example, camp A covers around 3 ha, while the neighbouring camp B covers 7 ha. Camp C, on the Montagne de Bussy, is probably the best known, enclosing around 7.8 ha within a single ditch. Excavations here, following several successful seasons of aerial photographic work (Reddé *et al.* 1995, 91-93), have clarified the defences in the area of the north-east gateway (fig. 14a). Here, the camp ditch was fronted by two parallel rows of 50 cm-wide slots, interpreted as some form of obstacle (Reddé *et al.* 1995, 119); it is not clear whether these surrounded the entire camp, or only the northern exposure. The 12 m-wide gateway was covered on the outside, at a distance of around 8.5 metres, by two similar slots, almost 30 metres long, apparently fulfilling the function of a *titulum*; there was also an internal *clavicula* (Reddé *et al.* 1995, 119-120).

Military operations were restricted on three sides of the *oppidum* by the river valleys of the Ose and Oserain, but the open meadow of the Plaine des Laumes to the west, scene of Vercingetorix’s ill-fated cavalry attack (Caes., *Bell. Gall.* 7.70), offered a likely route, either for a massed eruption from the town, or for the approach of a relieving force. So Caesar secured it with a ditch, allegedly twenty feet (6 m) wide with perpendicular sides (Caes., *Bell. Gall.* 7.72). In fact, the results of a section cut across the feature in modern times show that the ditch was just over 3.0 m wide by 1.3 m deep, and flat-bottomed with a “trough-like” profile, prompting the excavators to comment that “one should not take Caesar’s description strictly literally” (Schnurbein & Sievers 1996, 362).

Caesar claims to have laid out his siege-lines 400 feet (118 m) farther back (Caes., *Bell. Gall.* 7.72), but in fact there is a gap of up to 900m; the emendation to 400 paces (e.g., Edwards 1917, 483; Handford 1951, 191: "some six hundred and fifty yards") is still around 300 m short. Harmand suggested that Caesar had originally planned the line to be around 400 feet to the rear, but subsequently altered the scheme (1967b, 128-131; 1984, 278); clearly, this debate cannot easily be resolved.

According to Caesar, the Roman defences consisted of two ditches, each 15 × 15 feet (4.5 m), the inner of which was filled with water, followed by a palisaded rampart (*agger ac vallum*) with turrets every 80 feet (23.6 m). Nothing is known of the siege-lines in the valleys of the Oze and Oserain (Bénard 1996, 54), but recent excavations on the Plaine des Laumes have confirmed the broad outlines of Caesar's scheme, while emphasizing differences of detail (fig. 14b). The inner of the two ditches (Ditch 1) was found to be around 4 m wide and 1.5 m deep at one point, and elsewhere was around 6.5 m wide by 1.25 m deep; the excavators found confirmation that the ditch had been filled with water. Five metres farther back, the second ditch (Ditch 2) was consistently 2.7 m wide, but its depth varied between 1.5 m and 1.1 m (Reddé *et al.* 1995, 95-96). The profile of both ditches fluctuated between v-shaped and flat-bottomed, a phenomenon already noted elsewhere on the site (Harmand 1967b, 157-158). Surprisingly, fifteen metres behind these ditches, a third ditch (Ditch 3) was discovered, again varying between v-shaped and flat-bottomed profile, and measuring from 1.1 m to 3.2 m wide, with a depth of 0.8-1.4 m (Reddé *et al.* 1995, 98; Reddé & Schnurbein 1997, 175).

Along the turf rampart, which lay about 3 m behind Ditch 3 on the Plaine des Laumes, ran a series of four-posted turrets, at roughly 15 m intervals, of which ten have been identified. The spacing of the post-holes indicates a structure approximately three metres square. The excavators postulated that, while the front posts were sunk into the rampart, the back posts were free-standing. Although their reasoning is sound, based on the fact that the rear timbers were generally sunk deeper than the front timbers, this would result in a remarkably narrow turf rampart. There is no sign of timber revetment at the front, as found in similarly narrow Augustan-Tiberian fortifications (Jones 1975, 14-18), and the excavators concede that the front face must have been battered. How-

ever, they fail to note that a narrow turf rampart implies a low rampart (Jones 1975, 69-70), and their comparison with The Lunt, where the rampart base was 5.5 m wide, is inappropriate (Reddé *et al.* 1995, 99). Consequently, the height of 12 feet (3.5 m), quoted by Caesar (*Bell. Gall.* 7.72), must have included the *lorica* and *pinnae*, erected on top to protect the walk-way.

Caesar claims to have added further obstacles: rows of five *cippi*, or tree-trunks with sharpened branches, sunk into five-foot (1.5 m) ditches; eight rows of *lilia*, or sharpened stakes, set vertically in three-foot (0.9 m) pits and concealed by brushwood; and *stimuli*, barbed spikes fixed in foot-long (0.3 m) pieces of wood and buried at random. Interestingly, six rows of small post-holes, roughly 20-30 cm in diameter and some showing evidence of a 4-5 cm post-pipe, were found in the intervallum between Ditches 2 and 3 (Reddé *et al.* 1995, 96-97); set at regular intervals, but staggered from row to row, they immediately evoke the quincunx pattern of Caesar's *lilia*, although on a smaller scale. The excavators suggested that these were *stimuli* (Bénard 1996, 54; Reddé *et al.* 1995, 96), but the wooden component was a fraction of Caesar's reported 30 cm, and there were no signs of the metal spikes.

Excavations have also elucidated the situation on the Plaine de Grésigny, to the south-east of Mont Réa, where there was no trace of Ditch 3. However, Ditches 1 and 2 were both found to be 3.8 m wide (i.e., still narrower than Caesar's 15 feet) by 1.3 m deep, and set 7.5 m apart; traces of flooding were again found in Ditch 1 (Reddé *et al.* 1995, 103). In the intervallum, four rows of small post-holes, 20-30 cm in diameter, and set 30-40 cm apart, have been interpreted as evidence of a wicker fence, although they may represent another obstacle field, similar to the one on the Plaine des Laumes. (Note that the diameter matches Caesar's description of *stimuli*.) Two sets of large post-holes, approximately 5 metres behind Ditch 2 and spaced 15 metres apart, would appear to belong to a pair of turrets; the front posts must indicate the position of the rampart, of which no traces survive here (Reddé *et al.* 1995, 103).

In the area where the line turns around Mont Réa, the excavators found only a single ditch, 5.5 m wide by 2.2 m deep; they declined to speculate whether this was a con-

tinuation of either Ditch 1 or 2, or a completely new feature. At any rate, it was fronted by six or seven parallel rows of small post-holes, 40-50 cm in diameter and 20 cm deep, staggered to form a quincunx pattern and hence probably some type of obstacle (Reddé *et al.* 1995, 104). Further west, the ditch was found to measure between 3.4 m and 3.6 m wide, by 1.3 m deep, with a rounded bottom; it was fronted by two rows of the familiar small post-holes, indicating either a wicker fence or an obstacle field (Reddé *et al.* 1995, 104).

These findings demonstrate that much of Caesar's description is simply wrong, from the number of ditches and their respective dimensions, to the spacing of the turrets. It has even been argued that, if the primary armament of the turrets was artillery (cf. p. 182), a spacing of 80 feet (23.6 m) would have been too short, and that Caesar's *pedes* should be emended to *passus* (Holmes 1911, 810), to give an interval of 118 metres. With the archaeological discovery of the turrets' post-holes, laid out roughly every 50 Roman feet, this discussion is now academic, and it can be seen that neither 80 *pedes* nor 80 *passus* is accurate.

Having laid out one line of siege-works, running for some 11 miles (= 16 km; Caes., *Bell. Gall.* 7.69), Caesar then constructed a 14-mile line (= 20 km) of "similar fortifications of the same kind, facing the other way against the enemy outside" (*Bell. Gall.* 7.74). The actual length of the inner line is only around 12 km (Harmand 1984, 281), the outer nearer 15 km (Harmand 1967b, 174).

On the Plaine des Laumes, about a hundred metres outside the first siege line, was a compacted gravel surface, presumably corresponding to the outer rampart, and a series of three towers, about 17 metres apart and similarly sized to those on the inner line (Reddé *et al.* 1995, 110; Bénard 1996, 58). Beyond the rampart lay a 3.5 m-wide, 1.0 m-deep, v-shaped ditch (Ditch 2), followed by an 8.0 m intervallum, and an outer, flat-bottomed ditch (Ditch 1), thought to have had an original width of around 5.7 m and showing traces of flooding (Reddé *et al.* 1995, 107-110; Bénard 1996, 58). Obstacle fields, similar to those on the inner line, were incorporated in the system: four parallel rows of small post-holes were discovered in the intervallum, and again interpreted as

stimuli (Bénard 1996, 58); a different feature was found beyond Ditch 1, consisting of a five or six metre band of holes in a quincunx pattern, each one tapering from its mouth, 30 cm across, to a subterranean point at a depth of 30-37 cm. These have been interpreted as Caesar's *lilia* in miniature (Reddé *et al.* 1995, 106-107; Bénard 1996, 58), though it should be noted that no traces of a central stake were found.

A peculiar phenomenon was noticed to the south-east of Mont Réa, on the Plaine de Grésigny, where the outer siege-line betrayed two phases of development. The first phase comprised a flat-bottomed ditch (Ditch 1), 3.3 m wide and 80 cm deep, and originally filled with water; three rows of shallow pits, 50 cm wide by 10 cm deep; and another flat-bottomed ditch, 80 cm wide and 20 cm deep, interpreted as the foundation trench for a palisade line, owing to the presence of patches of charcoal along its base (Reddé *et al.* 1995, 111-112). However, a second phase, lying on a different alignment, comprised a v-shaped ditch (Ditch 2), 3.85 m wide and 1.5 m deep, displaying traces of rampart collapse in its fill; three sets of post-holes, 2.5 m and 5.5 m to the rear, representing turrets built into the thickness of the rampart; and, in front of the ditch, two parallel slots, 1.5 m apart, interpreted as foundation trenches for *cippi* (Reddé *et al.* 1995, 112). This is the clearest evidence that changes were being made as the system was laid out, and that it was not laid out to a perfect blueprint, as Caesar's account suggests.

The claim to have discovered evidence of *cippi* is significant, because it has always been unclear whether Caesar was describing five rows of ditches, or a variable number of ditches, each containing five rows of *cippi*. Napoléon favoured the first interpretation, which has coloured all subsequent reconstructions (e.g., Connolly 1981, 292), but the latter, championed by Holmes (1911, 811), is a more logical interpretation of Caesar's description (cf. Handford 1951, 191-192: "five rows in each trench"; similarly, Keppie 1984, 92). However, it must be admitted that the two archaeologically-recognised ditches, each 20-25 cm wide and 16-20 cm deep, are too small to have accommodated multiple rows of tree-trunks. Of course, if the recent excavations show anything, it is that the physical features never exactly match Caesar's idealised description.

The outer line of the circumvallation incorporated Camp C on the Montagne de Bussy and Camps A and B on the Montagne de Flavigny. At the former, the siege-works consisted of a single ditch, 3.5 m wide and around 40 cm deep (Reddé *et al.* 1995, 115; see fig. 14a). This was fronted by four parallel slots, about 1.25 m apart, marking out a zone around 7 metres deep. Each slot contained an alternating sequence of larger and smaller post-pipes (approximately 10 cm and 20 cm diameter), spaced every 50 cm, which the excavators have again interpreted as *cippi* (Reddé *et al.* 1995, 113-115). Certainly, some form of obstacle field is implied. The line of siege-works halted about five metres from the corner of Camp C, leaving a *de facto* postern, but no gate structure is evident (Reddé *et al.* 1995, 122-123). Around twelve metres back along the line, a pair of double post-holes was found, indicating the presence of a turret and marking the position of the rampart, now disappeared (Reddé *et al.* 1995, 116-117).

As mentioned above, the latest scheme favours six camps, established on the heights around the Gallic *oppidum* (Bénard 1996, 48-49). Of Caesar's twenty-three *castella*, no sign has been found. However, an interesting feature on the Plaine des Laumes may have some relevance (figs. 13 and 14b). Here, in the space between the inner and outer lines of defences, a 120 m compartment (designated "4 bis", because of its proximity to Napoléon's proposed Redoubt number 4) was defined by lines of rampart and ditch, the north-western one facing north-west, the south-eastern facing south-east; the ditches were found to be 3.8 m wide and 1.1 m deep (Bénard 1996, 49-51; Reddé & von Schnurbein 1997, 177; Reddé *et al.* 1995, 100-101).

The excavators have suggested that, if an assailant succeeded in crossing one of the lines of circumvallation, this feature was designed to prevent them overrunning the heart of the Roman siege system, unopposed. The south-eastern rampart appears to have had a gate structure, adjacent to the inner line of circumvallation, while the north-western rampart displays a *titulus*-like offset in the corresponding position. The excavators have emphasized the constructional sequence (the compartment not only respects the circumvallation, but utilises it for its north-eastern and south-western ramparts, and hence post-dates it), along with the fact that Caesar's *castella* were allegedly built before the circumvallation (cf. Caes., *Bell. Gall.* 7.69). However, despite their reserva-

tions, the “compartment” surely served the purpose of a *castellum*. In any case, we have seen that it is unwise to press the details of Caesar’s narrative, and the compartment need not be a later addition, but may well be contemporaneous with the entire siege system. It may well be asked how many more of these compartments lie undiscovered along the circumvallation.

Throughout, I have referred to the inner line and the outer line, to avoid confusion with terminology. It is true that, for most scholars, an encircling work is known as a circumvallation (e.g., Veith 1906, 54: “Umwallung (circumvallation)”), and on the few occasions where a “bicircumvallation” is in evidence, the additional outward-facing barrier is known as a contravallation (e.g., Veith 1906, 54: “eine äußere Kontravallationslinie”). However, at Alesia, French scholars have perversely coined the term “contrevallation” to describe the phenomenon which, under normal circumstances, is called a circumvallation (cf. Harmand 1967b, 119 n. 3), and have applied the term “circonvallation” to Caesar’s outward-facing line. This transposition is traditionally retained for the site of Alesia, though even there the convention is not universally observed (cf. Le Bohec 1989, 145). At any rate, it certainly does not reflect “the usual conventions of military terminology” (*contra* Davies 2000, 153) and should be discouraged at other sites.

In the final analysis, although the archaeological findings do not provide an exact model of Caesar’s description, they emphasize the peculiar and complex nature of the site. Bénard has commented that Caesar simply presents an inventory of the individual elements, and not a precise description (1996, 59: “un inventaire des ouvrages (fosse, rempart et pièges) et non une description pointilleuse”), but the important point is that he was obliged to simplify numerous variations for reasons of clarity, concision and stylistic elegance (cf. Reddé & von Schnurbein 1997, 178).

3. Ategua (Spain)

The situation at Ategua (no. 149), known only from aerial photography, is much simpler. Caesar’s base camp remains to be discovered, but Corzo claims to have identified the circumvallation, some of the towers, and several small installations (Corzo 1986, 690). Unfortunately, the published photographs are not at all clear, and Corzo has nei-

ther transcribed nor annotated them. The rectangular encampment that he identified on the north side of the town (1986, 691) would repay the effort of excavation, as would the circumvallation itself.

4. Machaerus (Jordan)

A circumvallation has been discovered at Machaerus (no. 190), although Josephus does not mention one (fig. 25). Besides the remains of ten or eleven encampments, individual stretches of the connecting barrier have been traced, totalling approximately 2½ km out of the complete 3 km circuit. However, the main camp, which must have existed nearby, has not yet been found. Josephus reports that the stronghold, one of Herod's fortresses, lay on an inaccessible hill, surrounded by deep ravines (Jos., *Bell. Jud.* 7.166), but the topography is far less severe than at Masada.

In plan, the circumvallation is rhomboidal, with an apex at each point of the compass (although the eastern corner can no longer be discerned). The north-western and south-eastern sides each comprise two stretches on slightly different alignments, as if constructed by separate work-gangs moving inwards from the corners. It seems likely, then, that the four corner camps were established first, assuming that one existed at the eastern corner. The wall itself is, on average, 1.9 m wide (Strobel 1974a, 120: "between 1,8 to 2 m"; 1974b, 144 n. 58: "eine Stärke von 1,8 bis 1,9 m"), though apparently, in the south, it reaches a width of 2.2 m in places (Strobel 1974b, 144).

At the southern apex, sited on a hill equal in height to the fortress itself, lies Camp B, a parallelogram (*ca.* 0.19 ha) with walls around 2 metres thick; Strobel has suggested that a 14.5 m × 12.0 m room, marked out by heavier stones in the south-west corner, represents the foundations of a tower (1974b, 146; not mentioned at 1974a, 117). From here, a stretch of the south-east side was detected as far as the Southern Wadi el-Mishnaqa. Far better preserved is the south-west side of the circumvallation, running along a gradually diminishing ridge to the north-west. Halfway along, around 350 metres from B, lies the small, rectangular Camp C (*ca.* 0.02 ha) (Strobel 1974a, 117; 1974b, 147), and at the western apex of the system lies Camp D, an elongated square (*ca.* 0.125 ha), both with the standard 2 m-thick walls (Strobel 1974a, 114; 1974b, 150).

Interestingly, Strobel discovered a series of expansions along this stretch of the circumvallation, and took their presence to be somehow related to the relatively low height of the ridge, implying a strategic weakness. Eight were detected on the stretch between camps C and D, spaced at intervals of roughly 30 metres, the smallest measuring 1.8 m \times 3.0 m, the largest 2.5 m \times 4.0 m, with the longer dimension extending laterally along the barrier (1974a, 117; 1974b, 148). Another two larger examples were found on the stretch between camps C and B, measuring around 2 m deep and extending 4.0-4.7 metres along the barrier (1974a, 117; 1974b, 147). Strobel believed that they resembled the foundations of towers, and compared them with the towers at Masada (below, pp. 117f.), which were in turn linked to the Numantia examples (above, p. 104).

From Camp D, the circumvallation runs due north, down the slope of the Southern Wadi el-Mishnaqa for about 150 m, before abutting with Camp E (*ca.* 0.025 ha), which is well placed to control any movement along the broad valley bottom, some 30 m below. It was perhaps intended as a rectangle, but the north wall extends farther from the barrier than the south wall (Strobel 1974a, 114; 1974b, 152). Two platforms of stones, one towards the north end of the camp (4.0 \times 4.0 m), the other towards the south end (5.0 m \times 5.5 m), have been interpreted as catapult-platforms (Strobel 1974b, 153: “Es ist denkbar, ja, nicht unwahrscheinlich, daß auf diesen relativ mächtigen Sockeln Geschütze postiert waren”). Opposite Camp E, on the other side of the valley, Strobel postulated a counterpart, Camp F, on the basis of stone scatters (1974a, 114; 1974b, 153), but this must remain unproven.

In crossing the Southern Wadi el-Mishnaqa, the circumvallation changes alignment, tracking back to the north-east, and incorporating the tiny Camp G (*ca.* 0.012 ha) on the way (Strobel 1974a, 114; 1974b, 155). The line peters out as it reaches the high saddle, linking the fortress of Machaerus with the ground to the west, but it commences again, to head down the side of the Northern Wadi el-Mishnaqa on a different alignment. Approximately 50 m above the valley bottom lies Camp I (*ca.* 0.04 ha), no doubt fulfilling the same function as its southern counterpart, Camp E. Abutting the north wall of the camp, Strobel detected a massive concentration of stones, 6.0 m wide by 8.0 m long,

which he interpreted as an observation platform (1974b, 159; not mentioned at 1974a, 109).

The wall heads back up the other side of the Northern Wadi el-Mishnaqa to the northern apex of the system, where Strobel interpreted a widespread scatter of stones as Camp K (1974a, 109; 1974b, 161). He postulated the presence of heavy artillery here, on the basis of a limestone ball of 40 cm diameter, found nearby (1974a, 109; 1974b, 161-162; see further, p. 181, below).

From the north apex, the circumvallation turns southeast for a distance of around 175 m, before kinking northeast to correct its alignment and abut Camp L (*ca.* 0.04 ha), 100 m farther on. Strobel has interpreted the kink as a bastion, commanding views of the northern valley (1974b, 162), but it may just be the result of a correction to another poorly-aligned stretch. No traces of the northeastern quadrant of the system were recovered, although a new length of circumvallation has been suggested on the basis of aerial photography (Kennedy & Riley 1990, 99).

The Roman assault was launched from the west, along the ridge of high ground (see below, p. 151), and it is in this vicinity, some 60 m behind the circumvallation, that Strobel discovered Camp H (*ca.* 0.18 ha). With walls 2.9 m thick, it has more robust defences than the other camps, and, in combination with its commanding position, it is probably to be interpreted as the headquarters (Strobel 1974a, 109; 1974b, 157-158).

5. Masada (Israel)

Josephus records that when Flavius Silva advanced against Masada (fig. 26), “he immediately conquered the whole vicinity, planting posts (*phrourai*) at the most advantageous points, and threw a wall in a circuit all around the fortress, so that none of the besieged could easily escape” (Jos., *Bell. Jud.* 7.275-276). Studying the site from aerial photographs, Hawkes believed that Silva first encamped on the east side at B, but then abandoned the site and transferred to F, “the second position of X Fretensis” (1929, 199); his reasoning was partly based on the interpretation of B as a temporary camp

(1929, 201), but also on his reading of Josephus, whom he took to imply that Silva had moved to the so-called Leukē, on the western side, from an earlier position elsewhere.

On the contrary, Camp B is no more temporary than any of the other works, despite the absence of associated *canabae* (Hawkes 1929, 201); no-one would now suggest that it belongs to a different phase from Camp F. Furthermore, the Leukē was not the site of Silva's camp (whether primary or secondary), but an advanced position at the base of the western crags; Josephus simply says that "Silva, having moved up onto it [*viz.* the Leukē] and taken possession of it, ordered his troops to build up a mound" (Jos., *Bell. Jud.* 7.306). Hawkes (in collaboration with Richmond) later criticised Schulten for assuming that Camps B and F were contemporary (Hawkes & Richmond 1934, 73), but Richmond later modified his position (1962, 145: "B occupies the site of a temporary work, perhaps belonging to the initial stage"). In fact, there was never any reason to suspect more than one period of occupation in any camp, except F (below, p. 116).

Faint traces of a 1 ha rectangular camp are discernible surrounding Camp C; its defences had perhaps been quarried to provide material for the latter (fig. 52; cf. Hawkes 1929, 201 and plate IV). This earlier camp has escaped scholarly discussion (Richmond makes no mention of it, although he shows it on his plan: 1962, fig. 5), but it perhaps accommodated an advanced reconnaissance party, rather than belonging to an altogether different occasion. (Hawkes, *ibid.*, suggests an unattested expedition by Ventidius Bassus in 39 B.C.)

It would accord well with standard practice (above, p. 87), if Silva had established camps at B and F, prior to commencing the other siege-works. It is interesting to note that they are very similar in layout and size (1.99 ha and 1.96 ha, respectively), and each has four clavicular gateways (cf. fig. 54), whereas the other camps display a range of styles (cf. Richmond 1962, 146). Silva will then have established supplementary encampments, prior to constructing the barrier itself (Schulten 1933, 93; Richmond 1962, 153). The detached camp C (fig. 52), while really only fortlet-sized at 0.43 ha, will have supplied manpower to patrol the eastern sector; the others in the vicinity, A and D, at 0.24 ha, are little more than half as large. Similarly, in the west, the 0.43 ha camp E

will have been the lynch-pin (fig. 54), with much smaller outposts at G (0.19 ha) and H (0.15 ha). (The later reduction of Camp F to F² has been convincingly explained as accommodation for a garrison left behind after completion of the siege: Yadin 1966, 218-219, proving the conjectures of Hawkes 1929, 211; Hawkes & Richmond 1934, 74; Richmond 1962, 152; and disproving Schulten 1933, 156-162.)

Richmond believed Camps D and H to “lie far outside the range of any serious sortie and quite off the line of practicable escape-routes” (1962, 152), however Yadin noted that, while H was obviously sited for its observational role (1966, 223; cf. Domaszewski 1909, 224 n. 1), D was well placed to guard the Wadi Nimre (1966, 222; cf. Schulten 1933, 152), along which individuals could easily have made a surreptitious exit, Richmond notwithstanding. In fact, Richmond believed D (and H) to have been “designed solely as patrol forts” (1962, 152), but the existence of a substantial officer’s house in D (Schulten 1933, 153) perhaps indicates a more important role for the camp, situated at the head of the supply route to En Geddi.

The roles of B and F are doubled by A and E, and Camp C covers a gateway through the circumvallation onto the broad, level expanse, stretching between 50 m and 250 m up to the foot of Masada; it is significant that the “Snake Path”, the only means of access to the fortress top from the east, came down onto the plain opposite C. Finally, the peculiar Camp G, whose key-hole shaped defences narrow as they ascend the western slope, served as a link between the command centre in the north-west and Camp H, isolated on the high plateau above, as well as affording a clear line of sight with Camp A. Yadin also observed that, in desperate circumstances, the southern cliffs of Masada could be negotiated in mountaineering fashion, and Camp G was well placed to prevent this (1966, 223).

The circumvallation itself measures 4½ km, but, owing to the nature of the terrain, does not form a complete circuit: the eastern stretch was broken at D by the Wadi Nimre, and between A and C by the Wadi Sebbe; the western stretch was halted at F by the northern cliffs, and at H by the southern cliffs. Movement was still possible across all of these obstructions, except the vertiginous southern cliff-face (cf. Schulten 1933, 94, for an

attempt by his Bedouin guides to negotiate this), but the 2 m-wide zig-zag road traversing the cliffs in the north was probably usable only by foot and by mule, owing to the steep gradient.

Schulten was conscious of this separation into a western and an eastern sector, even stating that, while Silva arrived on the east side, a separate army corps arrived on the west from Hebron (1933, 92). However, as he acknowledges, the construction of the zig-zag road, linking the two sectors in the north, will have been a priority (*ibid.*), and there is thus no reason to separate the operations into two distinct theatres (*pace* Hawkes & Richmond 1934, 73). Although their idiosyncratic scheme of an eastern phase, “the cutting off a retreat (*sic*) by the completion of the eastern work”, followed by a later western phase, “when the works of assault were made” (*ibid.*), was quietly dropped in later years by Richmond, he unfortunately over-compensated by suggesting that “Silva slept in the headquarters at B, but occupied F during the day” (Richmond 1962, 151). This would certainly have been possible, but less than desirable, if he wished to maintain effective supervision of the developing assault.

Schulten thought it unlikely that a palisade preceded the dry-stone wall (1933, 92), and indeed, besides the general shortage of timber in this waterless zone, it is difficult to see how a palisade could have been planted in the rocky terrain (cf. Hawkes 1929, 203: “unnecessary as well as impossible”). Nor did Silva trouble to cut a ditch. The circumvallation itself incorporates five of the camps (A, D, E, G, H), of which only D lies entirely behind the line. The wall, dry-built with vertical rubble faces, varies between 1.50 m and 1.80 m thick (cf. fig. 51), and is estimated to have been three metres high (Schulten 1933, 93; cf. Yadin 1966, 215). Hawkes extrapolated a height of six feet (1.80 m) and a width of 10 feet (3.05 m) from the rampart spread which he observed, but he postulated the use of the soldiers’ standard issue palisade stakes to support a timber sentry-walk and breastwork, “for piled desert stones could hardly bear them alone” (1929, 202).

The security of the long, exposed eastern stretch between Camps A and D was tightened by a series of towers, set at 80-100 m intervals (Domaszewski 1909, 224; Hawkes 1929,

197; Schulten 1933, 93; Richmond 1962, 153; Yadin 1966, 215). Domaszewski marked fourteen towers on his plan (1909, fig. 1101), but admitted that he had spent less than a day at the site (1909, 221 n. 4). Hawkes's map, on the other hand, drawn from aerial photographs, shows twelve towers (plus two south of A and two west of D), all straddling the line, but one of these is actually the gateway through the circumvallation at Camp C (cf. fig. 52). One tower had evidently disappeared by the time of Schulten's visit, as he found only ten, and a single tower to the south of A (1933, 93 and Plan I). However, Richmond claimed to have discerned both towers south of A, and a new one on the north bank of the Wadi Sebbe, making the total back up to fifteen (1962, 153 and fig. 5). (During a visit lasting several days in October 1985, I could only discern those towers indicated by Schulten.)

Hawkes believed the towers to have been "timber framed, and timber walled above, with a solid stone lower storey at least as high as the wall they bestrode", somewhat resembling those at Numantia, but more in the manner of the turrets on Hadrian's Wall (1929, 202). This reconstruction was not well received, and Schulten's theory, that the towers were, on the contrary, stone-built, projecting 2-3 m forward of the line, with an upper storey for signalling (1933, 93), was accepted by Hawkes and Richmond (1934, 72). Although Richmond later side-stepped the issue of design, he questioned Schulten's statement that the towers projected only towards Masada, restating Hawkes's observation that they straddled the circumvallation (1962, 153). Schulten's proposed tower dimensions of approximately 5 m deep by 4 m wide have not been challenged.

Finally, Roth has made the surprising comment that "the circumvallation may have been constructed primarily as 'busy work' for the army" (1995, 101), based on his calculation that there were so many soldiers present that a dense system of pickets could easily have been established. It is more likely that, following Titus's experience at Jerusalem, the circumvallation was adopted as a standard preliminary measure, as it was apparently viewed during the Caesarian period.

6. Narbata (Israel)

A Roman circumvallation has been recognised at Khirbet el-Hamam (fig. 32), where a settlement, thought to be ancient Narbata, crowns a steep-sided, conical hill, and spreads across a low saddle to a second, southern hill (Zertal 1981, 112; 1995, 71-73). Curiously, the circumvallation consists of a U-shaped barrier, open to the south-east, which the excavator latterly attributed to a speedy surrender by the town (Zertal 1995, 77; 92); earlier, he had postulated wholesale stone-robbing for the construction of a large medieval building on the south hill, thought to be a Mamluk khan (Zertal 1981, 114-115). A third possibility, that the south-eastern side was deliberately left open, the gap being filled by soldiers (Zertal 1984b, 25), makes no military sense, is found nowhere else in Roman siegecraft, and may safely be discounted. The stone-robbing explanation seems most likely, given that a small stretch was apparently found on the western flank of the southern hill (Zertal 1981, 114: "on the southern side, only a small section of it survives"; not mentioned in the 1995 publication).

The overall length of the surviving barrier has been calculated as 1.5 km; the complete circumvallation will have measured somewhat over 2 km. Like Machaerus, the plan is rhomboidal, but no camps anchor the corners. Along the south-western stretch ("a-b" on fig. 32), the wall measured 2.2 m in width (Zertal 1981, 113); the excavation of a 10 m-long section on the north-eastern stretch ("e-f" on fig. 32) revealed that the 2.15-2.20 m-wide wall stood in a rock-cut foundation trench, and comprised an inner and an outer face of large stones (approximately 40 × 50 × 60 cm), enclosing a rubble core. A putative reconstruction of the wall attained 1.7 metres in height, which the excavator considered to be "about 70 per cent of its original height" (Zertal 1984a, 52; cf. 1984b, 25: "2.20 metres ... was apparently also its height"); later, the original height was estimated at "no less than 2 m" (Zertal 1995, 77).

The excavator found evidence of three camps, only one of which (Camp B) was bonded into the circumvallation; he postulated a Camp A, sited on the southern hill and obliterated by medieval building work (Zertal 1995, 80), but there is no real evidence for this. Camp B lies on the north-eastern stretch, slightly to the north of the mid-point, on the slope of el-Birkeh, from where it commands views over the north and east of Narbata.

A rectangle of less than 0.05 ha, it compares with the medium-sized camps L and I at Machaerus (above, pp. 113f.), but there is nothing as small at Masada. It is defended by a 2.2 m-thick rampart, which survived to a height of 1.5 m, but appears to sit on a raised stone platform which projects two metres beyond the camp on three sides (the east side was not excavated), and carries the circumvallation wall past on the west (Zertal 1995, 80-83).

The remaining camps lie to the north-west. Camp C, around 10 metres outside the circumvallation, is the smallest at only 0.015 ha (Zertal 1995, 83); in size, it lies midway between Machaerus camps C and G, which were designed as intermediate points between larger forts. However, here, it is solely responsible for the entire north-west sector, although apparently supported from the rear by Camp D. Set back approximately 150 metres, this camp lies on higher ground below the summit of el-Kuleileh, commanding a view over the western side of Narbata. Enclosed in poorly-preserved 2.5-3.0 m-thick walls, the 0.08 ha camp is the largest, but still cannot match the main forts, B, D, and H, at Machaerus.

Although, on different occasions, Zertal has mentioned three projecting platforms (1981, 114) and two towers (1984b, 25), only one of these features has survived into the final report (Zertal 1995, 77 and fig. 10). This is the platform, 1 metre wide by 3 metres long, projecting towards Narbata on the south-western stretch ("a-b" on fig. 32). However, he makes no further mention of this, and does not venture any interpretation. A buttress in this position would seem unnecessary, and it must be admitted that the feature defies explanation.

Zertal has likened Camp B to Masada camps A, D, E, G and H, characterised as "small, operational camps ... providing a base for patrols and other military activities" (1984b, 26), and "tactical bases rather than living-quarters" (1995, 91). The analogy is inaccurate, as troops undoubtedly bivouacked in A, D, E, G, and H at Masada, but Zertal's claim that they did not at Narbata leaves unanswered the question of living-quarters. Zertal side-steps this, by proposing that the troops involved "did not have sufficient time and manpower to build a sophisticated and larger system" (1995, 91), but he had

earlier postulated a work-force of 5,000 men supported by another 5,000 (1984, 118). Regardless of the army size, the construction of a base camp was fundamental (above, pp. 84ff.), and we must assume that such a camp lies undiscovered in the vicinity of Khirbet el-Hamam.

7. Bettir (Israel)

The ancient site known variously as Bethar, Beth-Ter or (as here) Bettir is located on Khirbet el-Yahud, a steep-sided plateau, connected by a saddle to a higher hill on the south-east side. It is enclosed on three sides by barrier walls, which probably originally formed a circumvallation. The outlines of two camps have been noted there (Kennedy & Riley 1990, 103), one of 8.3 ha, the other of 2.63 ha.; other, similarly sized or smaller, camps have been detected farther afield (fig. 28).

The four stretches of circumvallation, earlier observed by Alt (1927), were confirmed by Schulten (1933, 181-183): a roughly north-south stretch, lying to the east of Bettir (shown as a dotted line on fig. 28); a sharp corner and an 800 m stretch running west (also dotted); a doubled stretch, the so-called “ladder”, running south-west (“a” on fig. 28); and, following a 30 m gap caused by the laying of a railway, a straight stretch running south-east (“b”), with a short length apparently doubled. A southern loop, completing the circumvallation, was never discovered but was thought likely. The entire circuit would have measured some 4 km (Schulten 1933, 183). The remains have been extensively disturbed by a modern forestry plantation and cultivation terraces, and a housing estate now sits where the southern stretch would have run (cf. Kennedy & Riley 1990, 102-103).

No excavation has ever taken place along the circumvallation, but Alt reported that the north-south stretch to the east of the hill comprised two parallel walls with a 3.40 m infilling (Alt 1927, 12: “zwei parallelen Läufen mit durchschnittlich 3,40 m Zwischenraum”). Ussishkin’s tantalising remark, that “at places along the siege wall remains of structures can be discerned which probably served the guards on the wall” (Ussishkin 1993, 96), remains unsubstantiated; in particular, his plan (*ibid.*, 67) includes no substantial differences from Schulten’s, and he has perhaps been confused by the modern

cross-walls which Schulten discerned linking the legs of the “ladder” (Schulten 1933, 182; not shown on fig. 28).

Schulten was of the opinion that the curious doubling of the wall to form the “ladder” (“a”) indicated two lines of circumvallation, upon which he declined to confer a technical term (1933, 182-183: “eine doppelte Einschließungslinie”). Indeed, he took the opportunity to criticise Napoléon’s mistaken use of the terms “contrevallation” and “circumvallation” at Alesia (cf. above, p. 111). Nevertheless, as an example of Connolly’s “bicumvallation”, it is not persuasive. First, the outer line diverges sharply from the inner, until they eventually lie 35 metres apart. And second, the outer line continues far beyond the point where the inner line turns to join the south-west stretch of circumvallation (“b”). If both lines are Roman, the peculiar effect is perhaps caused by the correction of a misaligned stretch, in order to shorten the overall circuit.

8. Cremna (Turkey)

The town of Cremna is situated on a spur, surrounded to the north, east and south by steep valleys, and is only accessible from the west, where a well-built Hellenistic wall, equipped with a series of twelve towers, defends it against attack. The wall is fronted by a shallow valley, 130-220 m wide, to the west of which lies the first of two barrier walls; the second lies 180-280 m farther west (fig. 29).

The excavator has claimed that “two walls of circumvallation were built facing the city” (Mitchell 1989, 317; 1995, 195), of which the eastern ran “along the crest of the ridge which looks towards Cremna from the west” (Mitchell 1995, 201), and the western followed a second north-south ridge (*ibid.*, 204). The eastern barrier incorporates eight turrets, either on or slightly to the west of the wall, with a ninth (“Turret 7”) set back some 50 m to the west; the western barrier incorporates four turrets, either on or slightly to the east of the wall. Schulten would have had no hesitation in pronouncing the system “eine doppelte Einschließungslinie”.

Mitchell goes to great lengths to deny this interpretation, claiming that “there is no convincing evidence that it was designed to protect the Roman encampment against attacks

from the west” (Mitchell 1995, 204). On the contrary, the only evidence available, namely the siting of the turrets, strongly suggests that the western wall faced west. Mitchell’s own topographic survey (1995, 197 fig. 52) indicates that the two walls demarcate a wide corridor, at the edges of which the ground slopes away to east and west; just as the eastern wall commands the ground to the east from its position on a ridge, so the western wall dominates the terrain to the west (see fig. 29).

Strangely, Mitchell prefers to interpret the western wall as a kind of second line of defence against the town, although he is forced thereby to admit that “militarily ... it may have been superfluous” (Mitchell 1995, 204). There is no reason to believe that “any military planner will have reckoned that two investing walls were securer than one” (*ibid.*, 205), otherwise many more circumvallations would have been doubled. However, envisaging both walls facing east in this manner, with a forward line and a “fall back” position, is anachronistic. It is true that some town defences were laid out with *proteichismata* screening the main wall, but Mitchell’s scheme bears only a superficial resemblance to these.

Both walls were 1.8-2.0 m thick (Mitchell 1995, 196; 201), although “much of [the outer, western line] was less substantially built” (*ibid.*, 204). The quantity of tumbled stone suggested to the excavator that the walls had originally stood 2.0-2.5 m high (*ibid.*, 196; 201). At one point, the inner, eastern wall was carefully laid in a foundation trench, about 0.40 m deep, and rubble was packed between two faces of rough quarried stone. The peculiar double wall effect around Turret 13 recalls a similar feature at Bet-tir (above, p. 122), and may be the result of a realignment to ensure that the turret was enclosed behind the wall. At any rate, the excavator’s proposed interpretation as “a narrow enclosure for the animals which were needed for transport and supply purposes” (*ibid.*, 205) seems unlikely.

The turrets are irregularly spaced, and no information is available regarding intervisibility. Turret 2 is approximately 160 m north of Turret 1, near the south end of the inner line, while Turret 3 lies only 30 m further on (Mitchell 1995, 202). Here, again, a doubled stretch of wall may indicate remodelling. Turret 4 lies 150 m further north, set

back from the wall which loops around its prominent position. As the turret “may have enclosed a tower 4-5 m square” (*ibid.*, 202), and as the facing section of town wall displays an unusual degree of damage, the excavator postulated an artillery battery here. The next turret, Turret 5, lies 100 m farther on, and Turret 6 another 65 metres to the north. The stretch of wall between the two apparently exhibited “stone heaps (which) could represent the positions of siege engines” (*ibid.*, 203). Turret 7’s position 65 m farther on is vacant, as the turret is set on a hillock 50 m behind the line of the wall. Accordingly, there is a gap of over 100 m between Turret 6 and Turret 8, and another 50 m to Turret 9, sitting at the northern end of the line. No dimensions are given for any of these structures.

Turret 10 lies midway between the two barrier walls, and was perhaps sited to provide communications between the two. The twin barrier walls at Carthage (above, p. 100) were closed off at the ends, probably to prevent the kind of infiltration which Caesar fell victim to at Dyrrachium (no. 143); Turret 10 was perhaps sited with this in mind.

Turret 11 sits at the northern end of the outer line, around 110 m west of Turret 10. The spacing on the outer line is far greater than that on the inner line. A gap of about 175 m lies between Turrets 11 and 12, and the same between 12 and 13. Turret 14 is 360 m south of 13, but an intermediate post may originally have lain in the area now occupied by a putative encampment. This 0.17 ha enclosure, interpreted by the excavator as a headquarters building, abuts the outside of the western wall; this is certainly a curious position for the main camp, and we would expect the general in charge, apparently Terentius Marcianus, to be based nearer to the action. Although confidently plotted on the plan, the remains of the camp are very fragmentary; it has been suggested that the structure post-dates the siege (Davies 2000, 154).

The absence of any camps in the vicinity is peculiar, although it seems that the troops would have been accommodated in the area between the two barrier walls. The situation here is strikingly reminiscent of Scipio’s works at Carthage; there, Appian (*Pun.* 120) records that the space between the earthworks was used as a camp.

9. Hatra (Iraq)

The circular desert city of Hatra is surrounded, at a distance of 300-500 m, by a circumvallation approximately 9.6 km in length (fig. 27a). Andrae found it still standing up to 2 metres high in places, and up to 4 metres wide (Andrae 1912, 20). In several places, he revealed a rough stone foundation, supporting two facing walls and almost 2 metres of rubble core (fig. 27b); at metre intervals, the wall was braced internally by 0.5 m-thick cross walls, dividing the rubble core into compartments. The outer face was 0.50 m wide, whereas the inner face was 1.50 m wide, suggesting that the wall was oriented towards the city; traces of a shallow ditch inside the circuit appear to confirm this inward-looking orientation (Andrae 1912, 21).

Bradford contradicts Andrae's findings when he records that the wall was "a low earth-work only a few feet high" (1957, 73). Indeed, the barrier is sometimes called an "earth wall" (e.g., Drijvers 1977, 804: "einem äußeren, fast kreisförmigen Erdwall"), and later investigations have allegedly revealed a limestone rubble foundation, piled up with earth (Al-Salihi 1991, 188); judgement must be reserved pending publication of the details.

Scholars have been divided as to the origin of this fortification. Al-Salihi considers it to have been an outer circuit of the city (1991, 188: "invading soldiers would be visible to the defending Hatrenes when they crossed it"), but most other scholars agree that it represents an investing work. There remains a disagreement regarding the identity of the besieging force. It was Crawford's belief that the circumvallation was Roman (1929, 501-502; followed by Bradford 1957, 74), although the absence of guard-posts around its circuit might have given him pause for thought.

Andrae, on the other hand, preferred a Sasanian origin, on the grounds, firstly, that the Hatrenes would surely have destroyed a Roman work after the army's departure, and secondly, that such a painstaking enterprise must have resulted from a long siege operation (1912, 21). Others have accepted the logic of Andrae's argument (e.g., Stein 1941, 305-306: "protracted and heavy labours ... attribution to the prolonged Sasanian siege seems justified"; no particular reason is stated by Gawlikowski 1994, 49: "siege wall,

most probably due to Sassanian troops investing the place in 239 A.D.”), but the length of the siege really has no bearing on the problem. A siege-wall was just as likely to originate from a 20-day siege as from a 2-year siege, as Bradford noted (1957, 74 n. 2: “it is important to note that large earthworks can be raised very quickly by men under pressure”).

Others remain undecided, conscious of the fact that there still may be elements of the circumvallation which have not yet come to light (e.g., Gregory & Kennedy 1985, 398 note to p. 67: “we need not doubt that this circumvallation could belong to the final siege ... (nevertheless) Severus could have constructed this circumvallation”). Kennedy and Riley have made the novel proposition that a Roman circumvallation was re-used by Sasanian besiegers (1990, 107: “[Roman camps] dismantled by the Sasanian besiegers to repair the circumvallation”), a theory which has the advantage of being equally as difficult to disprove as it is to prove.

In the no-man’s land outside the east gate of the city, Andrae noted a three-sided building which lacked a rear wall; this he considered to have posed a threat to the besiegers in this sector (Andrae 1912, 22). Opposite it, behind the circumvallation, he detected a 6-metre high mound, with a flat top measuring 25 × 45 m. Although there were Arab graves associated with it, Andrae postulated a connection with the siege-wall, and Bradford has gone a stage further, suggesting that it was “perhaps a platform for *ballistae*”, or the vantage point from where Severus watched the progress of the siege (1957, 74). The three-sided structure could conceivably be some kind of outwork screening the eastern gateway, but the mound need not even be an element of the siege-works; both of these hypotheses require to be tested by excavation.

Whether or not we concede that a failed Roman circumvallation would have been levelled by the Hatrenes, the peculiar construction of the wall, and the absence of associated structures, are surely the decisive points in favour of a non-Roman origin. It seems that the Sasanians occasionally built siege-walls (e.g., Theod., *Hist. relig.* 1.11-12), and overall, it perhaps makes better sense to interpret the circumvallation at Hatra as Shapur’s work (above, p. 70).

As far as the Roman sieges are concerned, presumably marching camps associated with the attempts of Trajan and Septimius Severus remain to be discovered in the neighbourhood, also. Gawlikowski has attempted to elucidate the sequence of city defences, concluding that the walls which can be seen nowadays date only from the mid-second century, and that the defences which Trajan assaulted will have been mudbrick walls on a different alignment, marking a smaller city area (Gawlikowski 1994, 53-55). The repairs to the second century wall, of which Gawlikowski found evidence, will have been occasioned by the damage caused by Septimius Severus (*ibid.*, 52).

10. Burnswark (Scotland)

One other putative circumvallation remains to be considered. Visitors to Burnswark in the eighteenth and nineteenth centuries noted the existence of such a feature, curving around the eastern end of the hill (fig. 31). In his *Itinerarium Septentrionale* of 1727, the antiquarian, Alexander Gordon, describes “a huge rampart of stone and earth round by the end of the hill which joins [the southern camp] with the other square to the north-east [i.e., the northern camp]” (quoted by Christison *et al.* 1898/99, 201-202). Somewhat later (though prior to 1777), General William Roy, founder of the Ordnance Survey, discerned “some imperfect vestiges of two lines ... surrounding the east end of the hill, and including between them two weaker posts” (quoted by Christison *et al.* 1898/99, 207). A generation later, “the remains of a line of circumvallation, which appears to have surrounded the hill”, were still evident, to judge by Chalmers’ *Caledonia* of 1807 (quoted by Christison *et al.* 1898/99, 210).

One of Roy’s two intermediate posts, dismissed as a sheepfold by Collingwood (1925/26, 54), has been recognised as a native settlement (R.C.A.H.M.S. 1997, 180 fig. 192); the other has disappeared entirely, but is quite likely to have been a native settlement also, given the existence of others around the base of the hill. This leaves Roy’s circumvallation.

The fact that the hill was not completely surrounded was taken to cast doubt upon the identification of the earthworks as a Roman circumvallation (R.C.A.H.M.S. 1920, 95), although the evidence of Agrigentum should have served as a corrective. The further

objection, that “there is no such organic connection between the ‘lines of circumvallation’ and the large enclosures” (*ibid.*), was already apparent from Roy’s plan, published in 1793 (Christison et al. 1898/99, 206 fig. 3, although Barbour’s plan is less accurate at this point, whether by mistake or by design).

Schulten enthusiastically embraced Burnswark as another example of a Roman circumvallation, alongside Numantia, Alesia and Masada. But, for his assessment of the circumvallation, he relied almost entirely on Barbour’s report, as he considered the remains, viewed during a day-trip in August 1913, to have been almost entirely destroyed by later agriculture (Schulten 1914, 611). It is unfair to accuse him of “obtuseness and dogmatism” (Richmond 1955, 302), when he was guilty only of credulity.

Collingwood believed that Roy’s circumvallation was nothing more than an old field-division, declaring that “careful inspection ... was enough to cast grave doubt on its antiquity” (1925/26, 53). Birley respected Collingwood’s authority on this, assuming that “the rebels were contained within their stronghold by patrols and pickets, rather than by a ditch or palisade” (1939, 316), and Richmond poured scorn on the whole idea (1955, 300-302). However, it must remain moot, for Collingwood did not excavate the feature, and Barbour’s trench across it raises more problems than it solves.

Investigating the circumvallation to the north-east of the hill, Barbour found “a ditch in front with a rampart in the rear” (Christison *et al.* 1898/99, 235 and fig. 14), by which he evidently meant that the earthwork faced east. However, he identified a second line, closer to the hillfort, which he identified as “a road which has evidently joined the south and north camps” (*ibid.*, 236). Barbour’s trench, investigating the feature east-south-east of the hillfort, revealed a 10-foot pavement, cut into the slope, with a ditch and rampart to the east (*ibid.*, fig. 15). Curiously, the sequence of elements appears to be in reverse for a genuine circumvallation; the roadway is unshielded from the hillfort, but appears to be fortified on the outside. As Schulten noted, the roadway presents an oddity (Schulten 1914, 611: “eine Singularität”), but one which critics have quietly ignored; Collingwood claimed to have disproved it, but his trial trenches appear to have lain to the west, where there may have been no circumvallation (1925/26, 55: his investigation

of the circumvallation is linked with the so-called “west fort”, now thought to be a native settlement: R.C.A.H.M.S. 1997, 179).

The most recent commentary on the site prefers the “field boundary” interpretation (Frere & St Joseph 1983, 33), but it is perhaps unwise simply to dismiss a feature which General Roy evidently thought to be genuine. Only further archaeological work can elucidate its true nature. In the meantime, “the possibility that the two camps were linked by a road cannot be discounted” (R.C.A.H.M.S. 1997, 181).

11. Woden Law (Scotland)

Finally, in this section, it is worth mentioning the case of Woden Law, although it has only ever been claimed as the site of practice siege-works. In summary, several lines of earthworks are upstanding along the gentle southern and eastern slopes of a small, multivallate hillfort; the fort itself faces south-east, and access is difficult from the north and north-west.

The earthworks comprise three main groups (R.C.A.H.M.S. 1956, 171-172; Richmond & St Joseph 1982). An outer line (“W”) runs obliquely (north-south) and intermittently (four separate sections) along the lower slope, beginning far to the south of the hillfort itself, but approaching to within 100 m at its north end. It consists of a single, v-shaped ditch, fronted by a rampart, but a sizable section is missing as it draws level with the hillfort. A central line comprises two parallel ditches with a rampart in between (“X”), running from south-west to north-east, again beginning far to the south of the hillfort, and changing alignment slightly, to accommodate the presence of the outer line (“W”). Associated with “X” is a similar arrangement, again south of the hillfort, running perpendicular and crossing over “X” to within 15 metres of “W”. Finally, the inner group (“Z”), comprising three ditches and two ramparts, actually wraps around the hillfort, approaching to within around 40 metres of the hillfort ramparts at the southern corner.

Only group “Z” was sectioned, and the excavators contended that it illustrated “systematic engineering” (Richmond & St Joseph 1982, 282), with the frequent interruptions in the ditches constituting “striking evidence of soldiers’ gang-work” (Richmond 1955,

303). The excavators characterised the outermost rampart of this group as “a flat-topped mound 19 feet wide at the base and two feet high, retained by turf cheeks at back and front and ballasted throughout upon a triple layer of turfwork” (*ibid.*, 281); this, they further claimed, was evidence that the rampart served as “platforms or emplacements to carry siege engines” (*ibid.*, 282). The peculiar nature of the two other groups was explained by reference to “the apparent illogicality with which one unfinished work is abandoned for another” during field exercises (*ibid.*, 283), and the whole site was interpreted as a practice siege.

This conclusion has met with general approval (e.g., Frere & St Joseph 1983, 34-36), despite Halliday’s contention that groups “W”, “X” and “Y” are better interpreted as native works, on analogy with the likes of White Hill (Halliday 1982, 80-83). Indeed, even “Z” could be an outlying ring of hillfort defences. The absence of associated encampments is suspicious, and the explanation, that the hillside was too cold and wind-swept for soldiers to have bivouacked there (Richmond 1955, 303; Richmond & St Joseph 1982, 283), is at odds with the alleged fortitude and discipline of the Roman army (cf. Richmond 1955, 315). The excavators’ theory of artillery emplacements along the ramparts is forced, and, in the end, there is no compelling reason to see Romans at work on the hill top at all.

Dismissing Woden Law removes the last piece of evidence for the existence of practice siege-works, a category already reduced by the elevation of Burnswark to the ranks of genuine sieges. While Roman troops were undoubtedly drilled in various aspects of warfare (cf. Davies 1968), a discreet veil should now be drawn across the questionable notion that Roman troops required specialist training in assaulting hill-forts.

The preceding archaeological examples of Roman circumvallations support few general conclusions, beyond the fact that a besieged site might be enclosed by a system of ditches and ramparts or by a wall, and that the besieging force might be distributed around the perimeter in garrison posts. This latter element provides remarkably limited accommodation at Machaerus and Nabata, and is entirely missing at Hatra and at Woden Law, neither of which (I have argued) is likely to have been the scene of a Ro-

man circumvallation. However, it is also missing from Bettir, whose identification as a Roman circumvallation rests on toponymic similarity with the scene of a known siege (no. 197), and the undoubted presence of Roman camps in the vicinity. Similarly, the siege-works at Cremna are presumed Roman by association with an inscription found *in situ*; but the disposition of barrier walls, creating a 'secure zone' for the accommodation of troops, recalls the example of Carthage, or even Alesia, with its newly discovered 'compartment'.

We are used to the clear-cut examples of Numantia, Alesia and Masada, with their hierarchy of elements: large encampments, smaller guard posts, barrier wall with turrets. Commentators are often tempted to treat these as typological constants, but the fact that major differences occur, not only from one site to another, but within the same site, should warn against such rigid classification.

Chapter 4:

The Embankment

The historian Appian records that, at Utica in 204 B.C., Scipio Africanus raised embankments (*chōmata*) and battered the walls with rams; the implication is that the embankments took the form of runways for the advance of the wheeled battering-rams. This is the earliest recorded use of such structures by a Roman general. To be sure, there may be an element of truth to Livy's mention of embankments (*aggeres*) at Veii in 402 B.C., Satricum in 386 B.C., and Cales in 335 B.C., but machinery was surely not available to the Romans at this early date (above, p. 14); nevertheless, mounds of rubble might have been used to elevate infantry to the level of the enemy battlements, in preparation for a storming assault. The balance of probability, however, is that Livy has simply introduced elements of later siegecraft into his descriptions of early operations.

Embankments, denoted by the terms *agger* and *chōma*, feature in forty Roman sieges (see Table 18, p. 134). In eighteen cases, and probably in three others, their purpose was clearly to facilitate the advance of battering-rams. Admittedly, this is often deduced by implication, where a battering assault on the wall is reported following the construction of embankments, such as at Corinth and Heraclea. But, at Piraeus, the machinery pounding the walls is said to have been located on the embankments, and there is a clear association between the embankments and the battering-rams at Jotapata, Gamala, and Jerusalem. In general, the fact that the defenders' incendiary attacks were

habitually targeted on the embankment in order to neutralise the battering indicates that the two went hand in hand.

In addition, embankments are associated with the operation of siege-towers at sixteen sieges, although it must be admitted that only in a few cases can an unequivocal link be demonstrated. For example, at Themyscira, Lucullus is alleged to have used embankments and towers, and it seems reasonable to assume that the one facilitated the use of the other. At Metulum, Octavian's storming assault was delivered by means of boarding-bridges, while he himself is said to have observed from a tower; it is reasonable to assume that the boarding-bridges were extended from towers, particularly as Octavian then proceeded to use one of them, but again this is not explicitly stated. But the situation is clear-cut, for example, at Thala, where "towers were set on the embankment to provide cover for the work (*opus*) and the workers" (Sall., *Jug.* 76.5), and at Jotapata, where three towers fulfilled the same function (Jos., *Bell. Jud.* 3.284-285). These operations illustrate the primary purpose of siege-towers, to overlook the enemy ramparts and provide covering fire from an elevated position. Additionally, we may assume that, on many occasions, the siege-towers incorporated a boarding-bridge and a battering-ram, as prescribed by Vegetius (below, p. 203).

In a handful of cases, the embankments appear to have been erected for purposes other than the advance of machinery. At Carthage, when the Carthaginians fortified their quay-side with timber towers, Scipio constructed embankments from which to throw incendiary missiles; there is no mention of the use of machinery here. Similarly, at Mons Haemus, the embankment was evidently designed as a vantage point "from which stones, spears and fire-brands could now be thrown at the enemy" (Tac., *Ann.* 4.49). Nor is there any mention of machinery at Suthul, although there remains the possibility that the Romans intended to construct battering-rams or towers, before they were wrong-footed by Jugurtha and forced to withdraw (cf. above, p. 41). By contrast, Antony continued construction of the embankment at Praaspa, despite the fact that the Parthians had intercepted and destroyed his siege-train; we can only assume that the embankment could still be put to use, perhaps to carry an infantry assault, in the same way that Lucullus re-used the embankments at Nisibis.

	Cat. No.	Comment
Utica	64	for battering-rams
Atrax	71	for battering-rams + tower
Corinth	73	for battering-ram
Heraclea	78	for battering-rams
Nertobriga	92	for unspecified machinery
Intercatia	94	for battering-rams
Carthage	95	for infantry?
Suthul	103	for infantry?
Thala	106	for tower + battering-rams
Piræus	111	for battering-rams
Themyscira	116	for towers?
Nisibis	121	for machinery, but used by infantry
Jerusalem	122	for towers + battering-rams
Noviodunum	124	for tower
Veneti	125	for infantry?
Atuatuci	126	for tower + battering-ram
Sotiates	128	for towers
Avaricum	132	for towers + infantry
Uxellodunum	135	for tower
Pindenissus	136	for tower
Massilia	139	for towers
Ategua	149	for towers
Laodicea	152	for battering-ram
Jerusalem	159	for towers + battering-rams
Praaspa	160	for battering-ram? / intended re-use by infantry?
Metulum	161	for battering-ram + towers?
Segesta	162	for infantry?
Mons Haemus	170	for infantry?
Legerda	175	for infantry?
Jotapata	180	for infantry? / re-use by battering-ram / re-built for infantry
Gamala	183	for battering-rams
Placentia	186	for infantry?
Jerusalem	189	for battering-rams + towers
Machaerus	190	for battering-ram?
Masada	191	for battering-ram + tower
Sarmizegethusa	193	Possible: cf. pp. 70 & 142
Cremna	210	for battering-ram?
Byzantium	214	for towers + battering-ram
Bezabde	217	for battering-ram
Maiozamalcha	223	for battering-ram?

Table 18: Roman embankments explicitly mentioned at sieges

The armies of Macedon were certainly familiar with the use of embankments at this time, but they cannot be said to have occupied a prominent position in Macedonian strategy. In 199 B.C., Philip built embankments at Thaumaci, probably to facilitate the passage of heavy machinery across rough and broken terrain (Livy 32.4.1-7), but thirty years passed before his son, Perseus, used an embankment, this time to carry an infantry assault over the walls of Oaeneum (Livy 43.19.9).

Indeed, in the Hellenistic tradition, preparations for the advance of heavy machinery seem mostly to have taken the form, not of piling up a mound, but of smoothing the terrain, such as can be seen prior to Antiochus's siege of Syrix in 209 B.C. (Polyb. 10.31.6-13) or, better, Philip's siege of Echinus in the previous year (Polyb. 9.41.1-42.4). A similar procedure is recommended by Philon, in his work on siegecraft, when he refers to the besieger "making a road for the advance of machinery" (*Pol.* 3.64 = Th. 95; cf. 4.17 = Th. 98, perhaps referring to rolling the approach-road to make it level). Polybius specifically mentions that Antiochus and Philip both employed special vehicles, the so-called "ditch-filling tortoises" of Athenaeus and Vitruvius, to protect the men engaged in levelling the ground (cf. below, p. 196).

Schramm believed that the great Hellenistic siege-towers of the later fourth century, the *helepoleis*, had replaced the custom of piling up mounds as a means of elevating the besiegers to the level of the besieged (Schramm 1928, 226); in this, he was clearly thinking of the Spartan *chōma* at Plataea, but this was very much an isolated incident (Schramm 1928, 213-214; see below, p. 142).

For Hellenistic strategists, it appears that the construction of embankments was only ever occasioned by extraordinary circumstances. Whereas, Alexander's assault on Halicarnassus in 334 B.C. required only the filling of ditches to enable the towers to advance (Arrian, *Anab. Alex.* 1.20.8; Diod. Sic. 17.24.4), two years later, at Gaza, the sandy terrain impeded the wheels of the siege-towers, which were themselves necessitated by the elevated position of the town (Curt., *Hist. Alex.* 4.6.9, 21-22). Different circumstances prevailed at Tyre, where Alexander was obliged to build a mole to carry his siege-machinery from the mainland across to the island city; the *chōma* mentioned by

the Greek authors (Arrian, *Anab. Alex.* 2.18.3, 19.3; Diod. Sic. 17.40.5, 42.1) is described by the Latin author Quintus Curtius as a *mōlēś*, or bulky structure, supporting an *agger*, by which he evidently means the level runway for the siege-towers (Curt., *Hist. Alex.* 4.2.16, 21; 4.3.2-3, 6-8).

Before investigating the phenomenon of the embankment in Roman siegecraft, an enquiry into the terminology will be instructive. The primary meaning of *agger* is “things brought to a place in order to form an elevation above a surface or plain, as rubbish, stone, earth, sand, brushwood, materials for a rampart, etc.” (Lewis & Short 1879, 70, *s.v. agger*; cf. *O.L.D.*, “material for a mound, earthwork, etc.”). In the context of siege warfare, the secondary meaning of “the pile formed by masses of rubbish, stone, earth, brushwood, etc.” (Lewis & Short, *ibid.*) is often seized upon, without further consideration. Quintus Curtius’s description of Alexander’s mole at Tyre suggests a third possibility, namely “a military or public road, commonly graded by embankments of earth” (Lewis & Short 1879, *ibid.*; cf. *O.L.D.*, “a road or causeway raised above the level of the surrounding ground”). In the face of such ambiguity, we should proceed with caution.

The siege of Celenderis (no. 169) provides a case in point. Announcing the assault, Sentius Saturninus issued the following sequence of orders to his troops: that the horns and trumpets sound the attack; “*peti aggerem*”; that ladders be erected; that the most courageous should climb them; and that others should fire spears, stones and firebrands from artillery (Tac., *Ann.* 2.81.2). It would be most logical to translate Saturninus’s second command as “that the rampart be attacked”, however Furneaux objects that “Tacitus would hardly use ‘agger’ of the wall of a strong fort” (1884, 343). Admittedly, earlier on, Tacitus uses the same phrase, “*petendus agger*” (*Ann.* 1.65.7), in the context of collecting materials for an earthwork, during Caecina Severus’s withdrawal from the Teutoburg. He further notes that the task was made all the more difficult because many of the men had lost the tools for digging earth and cutting turf. Saturninus’s command at Celenderis will then have been to collect similar material, and Furneaux’s opinion, that “the material to be collected is here intended to fill the ditch or make the wall easier to scale” (1884, 343), is probably correct; Koestermann (1963, 403) suggests earth. If

there was a “mound”, such as Jackson suggests in the Loeb edition (Jackson 1931, 509), it need not have been a large one.

Caesar often uses the same phrase in situations where he clearly implies the gathering of timber. For example, in 57 B.C., to counter a surprise attack by the Nervii during camp-building, he writes that he had to recall the soldiers from their entrenching work (*ab opere*) and summon those who had gone out a little further “*aggeris petendi causa*” (*Bell. Gall.* 2.20). Holmes correctly interprets this as “fetching wood” (1914, 87), but Edwards, in the Loeb edition, misconstrues the meaning and introduces an unnecessary “ramp” (1917, 115f.: “in search of stuff for the ramp”).

During Caesar’s second invasion of Britain, his legionaries assaulted a fortified hill, thought to be Bigbury in Kent (above, p. 86), by advancing in a *testudo* shield-formation and “*aggere ad munitiones adiecto*” (*Bell. Gall.* 5.9.7). Most probably, the *agger* which the men are described as throwing against the fortifications is brushwood to fill the ditch and enable a concerted assault on the walls, similar to Saturninus’s operation at Celenderis. There is no need to postulate the construction of an embankment.

Indeed, it is difficult to imagine that construction work of any kind could have been accomplished beneath a roof of shields. Nevertheless, in A.D. 58, Domitius Corbulo’s men are reported to have undermined the walls of Volandum (no. 173) under cover of a *testudo* of shields, a tactic which Josephus explains more fully, in the context of Cestius Gallus’s similar attack on the Jerusalem Temple, eight years later (no. 176):

“The first (row) of the Romans propped their shields against the wall, and, upon these, those behind (propped) other (shields), and the rest likewise, fencing themselves in with what they call a ‘tortoise’, which the falling missiles slipped off harmlessly, and not even one of the soldiers was injured undermining the wall and preparing to set fire to the gate of the Temple.” (Jos., *Bell. Iud.* 2.537)

It seems that there was ample room beneath the *testudo*, despite its cramped appearance, for the front rank, at least, to engage in digging. Ditch-filling will then have presented

no problem, and probably proceeded in the manner described by Holmes: “the work of piling the lumber was performed by men who advanced between the files under protection of their comrades’ uplifted shields” (1914, 181).

Such ditch-filling seems often to have accompanied an escalade, as at Celenderis (above, p. 136). The *agger*, which Pompey instructed his men to collect at Dyrrachium in 48 B.C. (no. 143), was embarked along with archers and light-armed troops on fast boats bound for the unfinished southern sector of Caesar’s siege lines (fig. 17). Arriving at their destination, the Pompeians attacked the outer palisade with missile fire, while the ditches were filled with the *agger* which they brought along for the purpose, enabling the legionaries to mount an escalade (Caes., *Bell. Civ.* 3.62-63). It is unlikely that they would have transported earth in this way, and brushwood again fits the context best. Something similar no doubt occurred at Legerda (no. 175), where, in what seems to be a quick-fire encounter, the Romans broke into the town by using “*agger*”. It is doubtful whether there would have been time to erect anything substantial, despite Furenaux’s opinion (1891, 420: “an offensive work to command the walls”), and this is perhaps another instance of ditch-filling.

This ambiguity between the simple filling of a ditch with *agger*, in order to facilitate an escalade, and the accumulation of *agger* into a full-scale embankment creates a problem of interpretation. Even in an apparently clear-cut case, such as Caesar’s assault on Noviodunum (Caes., *Bell. Gall.* 2.12), we should keep an open mind. The Loeb edition translates Caesar’s ablative absolute, “*aggere iacto*”, as “(when) a ramp (was) cast up” (Edwards 1917, 107), but Holmes may well be correct to favour the primary meaning of *agger* here: “material ... shot into a moat with the object of filling it up” (Holmes 1914, 81). The translation offered by Handford (1951, 63) in the Penguin Classics edition – “earth shovelled into the moat” – captures the spirit of Holmes’s interpretation, whether or not this is Caesar’s precise meaning. (Notice that almost the same grammatical construction is used of material hastily scattered over a makeshift timber bridge, at *Bell. Alex.* 29.4, thus supporting the ditch-filling version of events at Noviodunum.)

Despite all of this, it is clear that, in Roman siegecraft, there was often a requirement to pile up a structure of wood, stones and earth against an enemy wall, occasionally to elevate infantry for a storming attack across the wall (above, p. 133), but in most cases to enable the approach of heavy machinery (above, pp. 132f.). The Suda entry for Ἀγέστα (A 203) reads “device (*mēchanēma*) of war erected from stones and timbers and heaped-up earth; some call such a device *agesta*”. There is an obvious connection with the Latin *aggestus*, “an accumulation”, and thence with *agger*. Indeed, Vegetius conveys more or less the same idea when he says, “the *agger*, on the other hand, from which missiles are thrown, is raised up against the wall, out of earth and wood” (Veg., *Epit. rei mil.* 4.15).

The classic example of a Roman embankment is Caesar’s construction at Avaricum, where the “single, narrow approach” (Caes., *Bell. Gall.* 7.15: “*unus perangustus aditus*”) was defended by a deep gully, necessitating an embankment 80 feet (23.6m) high (*ibid.*, 24). The town wall will only have stood four or five metres high, so the bulk of the structure must have been necessitated by a dip in the terrain (Wimmel 1974, 7; cf. fig. 11, where the town appears to stand some 20 metres above the surrounding marshes). Equally, the narrow approach comfortably accommodated an embankment 330 feet (97.6 m) wide.

The design of the structure proposed by General de Reffye for Napoléon III (fig. 33) received Holmes’s endorsement, and has found wide currency in popular publications (Holmes 1911, 602-603; 1914, 294 note; cf. Connolly 1975, 31). In summary, Napoléon’s design incorporated the two types of embankment proposed by French scholars of the time: the “terrasse-viaduc” and the “terrasse-cavalier”, of which the former was visualised as a runway, perpendicular to the enemy wall, whereas the latter was arranged parallel to the enemy wall. As there were two siege-towers, de Reffye proposed twin viaducts, aimed at the foot of the enemy wall; but, to give Caesar’s infantry access to the battlements, he added an intervening platform (the “cavalier”), only about 15 metres deep but with a 50-metre frontage, incorporating a double staircase at the rear. The entire edifice was built out of criss-crossing layers of timber, on analogy with the construction principle familiar from Trajan’s Column (especially scene LXVI = fig. 41; cf.

Saglio 1877, 142). Caesar's account gives no hint of such a complex design, but Holmes gave it cautious approval, deeming a ramp of entirely viaduct design, 330 feet wide by around 250 feet long, to have been too much work (1911, 603; cf. 1914, 294 note: "we may be sure that labour was saved as much as possible").

The complex design was criticised in 1939 by du Mesnil, fresh from his investigation of the Persian assault ramp at Dura-Europos. Ridiculing a system which resembled a boulevard, with an empty central reservation and twin towers rolling backwards and forwards at the sides, "as if in a game of chess", he proposed that Caesar had simply constructed an assault ramp (1939, 64: "non un boulevard ou un cavalier, mais une rampe d'assaut"). In addition, he believed it impossible for the Romans to have built the structure entirely of wood (*ibid.*, 62-63, in the process querying the relevance of Trajan's Column). Referring to the fire-extinguishing episode (Caes., *Bell. Gall.* 7.24), he questioned Caesar's ability to cut a fire-break across such a structure, indeed his ability to extinguish such an immense "pyre" at all (Mesnil 1939, 63: "cet immense bûcher"); and he doubted whether Caesar would have said that the embankment "was almost touching the enemy wall", if the main central section was in fact rising parallel to the wall. However, du Mesnil did not stop there: he proposed that the dimensions recorded by Caesar had been misunderstood, and that the figure of 330 feet was not the ramp's width, but its length; he proposed a width of only 10 metres (*ibid.*, 64).

Of course, du Mesnil performed a significant service in querying Napoléon's peculiar structure, but there is no need to doubt the reported dimensions. A runway only 10 metres wide would have proven unduly restrictive for two siege-towers (cf. Vegetius's dimensions, p. 203), and impossibly narrow, when the massed infantry assault is taken into account. Wimmel followed du Mesnil in proposing a dump-built ramp, similar to the familiar example at Masada (cf. fig. 55). Such a structure is naturally wider at the base, as the material settles; however, for no clear reason, Wimmel proposed that it was the overall width of this base that Caesar specifies, and not the actual runway along the top (Wimmel 1974, 39). His diagram suggests a runway of approximately 25 metres at the rear which, again for no clear reason, widens to 60 metres at the enemy wall (*ibid.*, 25 fig. 10). It must be admitted, though, that Caesar's figure of almost 100 metres is not

inherently unlikely. As Holmes stated, in a different connection, “the width of the *agger* must have depended upon its object” (1911, 604; cf. Veith 1928, 443: “die Breite in der Regel von der Zahl der vorzutriebenden Wandeltürme”).

As far as the nature of the embankment is concerned, the criss-crossing timber construction from Trajan’s Column has exerted a compelling influence. Rice Holmes quotes a theory, held by another of Napoléon’s associates, Colonel Stoffel, that “as soon as the inequalities of the surface had been removed, logs were passed from hand to hand to a group of workers, who arranged them in layers, descending like huge steps, those of each tier being laid cross-wise on those of the tier immediately underneath” (Holmes 1911, 604, noting that “it can neither be disproved nor proved”).

Du Mesnil was correct to question Napoléon’s wholly timber design, as our limited evidence points to a significant proportion of earth and stones, as well (cf. above, p. 139; Jos., *Bell. Jud.* 3.162, for “timber ... and masses of stones”). Unfortunately, he went to the other extreme, envisaging a structure similar to the Persian ramp at Dura-Europos, with lateral walls of mud-brick, 1.40-1.90 m thick, retaining an earth and rubble fill (Mesnil 1939, 64: “une levée de terre”). Such a style of construction is inappropriate for western Europe; in truth, the proportions of the various constituents will have depended upon local availability, but, as will become apparent, the Roman design required a timber element, no matter what else was thrown in.

The prevalence of wood is proven by the many occasions on which defenders attempted to set fire, not just to the siege equipment, but to the embankments themselves: viz., Heraclea, Avaricum, Uxellodunum, Massilia, Segesta, Jotapata, Jerusalem, Bezabde. At the latter, the besieged Persians sabotaged the Roman siege-works by inserting live coals “into the joints of one embankment, constructed with the branches of various types of trees, with bulrushes, and with armfuls of reeds” (Amm. Marc. 20.11.23); of course, these are surely just the combustible elements, listed by Ammianus to make his point. In addition, the collection of timber to build embankments is specifically mentioned at Heraclea, Piraeus, Jerusalem, Massilia, and Jotapata; and in prodigious quanti-

ties (e.g., Plut., *Sulla* 12; Jos., *Bell. Jud.* 3.162), though some of this will certainly have been destined for the dozens of shelters required by the workers.

Lucan preserves an interesting description of Trebonius's embankment at Massilia: the bulk of the structure was apparently earth and brushwood, compressed by a timber framework at the sides (Lucan, *Bell. Civ.* 3.396-397: *cum terra levis mediam virgulta-que molem suspendant, structa laterum compage ligatam artet humum*); he later refers to the "planks arranged lattice-wise" (ibid., 455: *stellatis axibus agger*), from which it appears that the sides of the mainly earthen embankment were retained by a framework, not dissimilar to Napoléon's criss-crossing pile of logs. But, where Napoléon's structure represented the entire embankment, the Massilia timbers represent only the sides of an earthwork. Carter, in his edition of Caesar's *De Bello Civili*, neatly encapsulates the design as "a bank made of earth with heavy timber shoring" (Carter 1990, 215), and it is perhaps the latter element that is represented on scene CXVII of Trajan's Column (fig. 44; see above, p. 70).

Corroboration for this style of construction comes from an unlikely source. Although there is some limited evidence for embankments of Hellenistic date (above, p. 135), there is only one example of a Classical Greek embankment: the *chōma* erected by the Spartans and their Theban allies at Plataea in 429 B.C. Our source of information, Thucydides, gives no dimensions, but it is the design of the structure that is of interest:

"So, felling timber from Cithaeron, they built (it) up on both sides, positioning (the timbers) crosswise to serve as walls, so that the mound would not spread out too much. They carried to it wood and stones and earth and whatever else might be used to complete it." (Thuc. 2.75.2)

It is clear that Thucydides envisaged a mound of debris with two retaining walls, one on either side, to give the structure solidity and prevent it spreading out. The walls themselves must have been built up as a robust framework of timbers, laid in a horizontal lattice pattern (cf. Connolly 1981, 277; *pace* Gomme 1956, 207: "wickerwork in place of walls"; Garland 1974, 142: "intertwining the branches in the manner of a protective

wall”). It was not the primary purpose of the mound to provide an elevated action station for the battering-ram, since Thucydides tells us that rams were applied elsewhere around the circuit, so it seems that the Spartans’ intention was to overtop the town wall for a massed infantry assault. Quite where they had got this idea from remains unknown, although it may be relevant that the Spartan king, Archidamus, appears to have been encouraging intercourse with Persia around this time, and the Persians are known to have assaulted towns by piling up mounds of rubble (Kern 1999, 58-61). Equally, a familiarity with the work of Herodotus might have implanted the idea (specifically Herod. 1.162, on the Ionian Revolt).

Liebenam endorsed the timber-framed theory (1909, 2242: “Baumstämme, kreuzweise übereinandergelegt, die Seiten bilden und dem Werke Halt geben, Erde, Steine, Faschinen, Strauchwerk”), believing that, as a general rule, the *agger* advanced, layer by layer, until it reached the same height as the enemy wall (*ibid.*: “Der Damm ... herangeführt unter schichtenweiser Erhöhung, bis seine obere Fläche mit der Mauerkrone wenigstens in gleicher Höhe liegt”). The latter point is disproven by the example of Avaricum (no. 132), where the troops still had to scale the wall (Caes., *Bell. Gall.* 7.27: *murum ascendissent*), probably using ladders. Admittedly, there is a difference between targeting an embankment on the wall foot, and raising it to the proximity of the battlements; in the former case, its purpose will have been merely to level the approach path, whereas, in the latter case, it must have been to enable an infantry assault, as at Oaeneum (above, p. 135) and Jotapata.

At the latter, Josephus makes it clear that Vespasian’s embankment was aiming for the battlements before the defenders heightened the walls (*Bell. Jud.* 3.171). After briefly contemplating a blockade, Vespasian returned to the assault and, “as the embankments were by this time drawing near to the walls, he decided to bring up the battering-ram” (*Bell. Jud.* 3.213). Although the wall was finally breached, the Roman attack was repulsed, so Vespasian built 50-foot (15 m) siege-towers to overlook the 20-cubit (9 m) high walls (*Bell. Jud.* 3.284). Josephus reports that the Roman embankment was again raised to overtop the walls (*Bell. Jud.* 3.316), and the final assault proceeded over the top (*Bell. Jud.* 3.324).

There are several implications arising from this account. First, Josephus's response to the approaching embankment was to heighten the wall, not to reinforce it, proving that he anticipated an attempt to cross over, rather than to break through. Second, the deployment of the battering-ram appears to be something of an afterthought, as if to salvage the time and energy spent on the failed infantry-assault ramp by converting it to a runway for machinery. Third, the embankment was again raised, indicating that Vespasian's original strategy was deemed preferable to the dangers of entering through the breach. And fourth, he is said to have erected siege-towers on the embankment, which, if Josephus is correct on this point, implies that the towers were gradually manoeuvred forwards as the embankment was completed. (Of course, Caesar had done the same at Avaricum.)

The massive north-western defences of Jotapata have been unearthed (fig. 23), standing at the top of a fairly steep slope, which was found to be covered with three to four metres of extraneous rubble mixed with arrow-heads and *ballista* balls (Adan-Bayewitz *et al.* 1995, 137 and 162; Adan-Bayewitz & Aviam 1997, 194). The topography of the site suggests that the Romans directed their assault across the wide ravine separating the hill of Yodefath from Khirbet Shifat to the north-west. Consequently, the embankment will have been intended to level the approach. Prior to the excavations, Connolly assumed that there was a deep defensive ditch (1983, 77), but there is no sign of this. Nevertheless, his reconstruction of a massive, level (as opposed to inclined) causeway may be deemed substantially correct, for the first phase embankment. The second phase would most easily have been achieved by sloping the surface up to the level of the new battlements, but, given the presence of the siege-towers, it would perhaps have been advisable to maintain as horizontal a surface as possible (cf. below, p. 204).

Perseus's embankment at Oaeneum was a straightforward means of storming over the battlements (above, p. 135), with no particular design constraints, but two other examples present a puzzle. According to Zosimus, at the siege of Byzantium in A.D. 324 "Constantine intended to capture the town, having constructed an embankment (*chōma*) of the same height as the wall, and having positioned wooden towers on the embankment (*chōma*), higher than the walls, by means of which (Constantine's troops) shot

down those guarding the walls, so that he could safely bring up rams and other machines to the wall" (Zos. 2.25.1). And, during Constantius's siege of Bezabde in A.D. 360, Ammianus Marcellinus emphasizes the increasing height of the *aggeres* (e.g., Amm. Marc. 20.11.13, 16), until they finally "overtopped the walls" (Amm. Marc. 20.11.20).

Battering-rams were present at both sieges, but in neither case do they appear to have been mounted on the embankments. Of course, it would surely have been sufficient to direct battering-rams at the lower part of the enemy wall, as Veith proposed as a general rule (1906, 56: "Das Niveau des Dammes mußte daher mit dem Fuße der Stadtmauer übereinstimmen"). Nothing precludes this, either at Bezabde, where the battering assault had commenced even before the embankments were begun, or at Byzantium, where Constantine's attack was forestalled by the town's surrender. In both cases, the main attack simply required the smoothing of the ground, the levelling of forward defences and outworks, and the filling of defensive ditches. In fact, at Gamala, Josephus specifies that "the filling of the ditches and ravines (was accomplished by) the tenth (legion)" (*Bell. Jud.* 4.13). Here, there was a definite requirement to even up the sloping ground (fig. 24), so that machinery could be brought up, but the breach appears to have been made at ground level (cf. fig. 49).

At Byzantium and Bezabde, it seems that the embankments played a supporting role, if not to facilitate an infantry assault, as at Oaeneum and Jotapata, then at least to provide covering fire. This is explicit at Byzantium, where siege-towers were mounted on the embankment to keep the enemy from the battlements, and implied at Bezabde, where Ammianus indicates that artillery-fire was directed from the embankments. In both cases, if the battering proved successful, there would have been the option to launch a diversionary assault over the battlements, drawing defenders away from the breach. But events took a different turn in both sieges.

The significance of Julian's "high platforms" (*arui suggestūs*: Amm. Marc. 24.4.12) at Maiozamalcha is not apparent from Ammianus's brief account. Hamilton implies a distinction between these and the embankments at Bezabde, rendering the former as "high

ramps" (1986, 171, 174 and 276), and the latter, first as "earthworks" (*ibid.*, 203), then as "mounds" (*ibid.*, 204). Crump, on the other hand, determinedly (but, in my opinion, erroneously) interprets all besieging earthworks as the ramparts of a "temporary contravallation" (Crump 1975, 107-108), and Nischer ignores the issue in his précis of the siege (1928, 600-601).

However, it seems reasonable to assume that the structures at Byzantium, Bezabde, and Maiozamalcha were all embankments, similar to the example at Jotapata. In particular, it is clear that they sloped gradually upwards as they reached the wall, because Ammianus glosses those at Bezabde as "artificial slopes" (*clivi structiles*: 20.11.22), and the *Historia Augusta* reports that the emperor Aurelian threatened to capture the town of Tyana by utilising a natural feature, which sloped up to the walls "in the form of a siege-embankment" (*specie aggeris*: HA, *Div. Aurel.* 24.1). Everything points to their intended use as infantry ramps.

Nevertheless, in many cases where the embankments were not raised to battlement-level, they must still have risen to an appreciable height. This is proven by the attempts of the defenders to undermine the structure, for example, at Utica, Piraeus, the town of the Sotiates, and Jerusalem; all sites where the embankment was associated, not with the elevation of infantry, but with the advance of machinery. Veith believed that "the height [was] dependent upon the unevenness of the terrain" (1928, 443: "die Höhe von den Unebenheiten des Geländes abhängig"), but the walls of Piraeus stood on a 2-metre plinth of enormous squared blocks (Lawrence 1979, 216), so it is fair to assume that Sulla's embankment was intended to carry the battering-rams above this layer. Indeed, it was common in fortifications of Hellenistic date for the walls to sit on a stone footing (e.g., Lawrence 1979, 205-207) and the towers to sit on solid bases (*ibid.*, 222-224). It may be no coincidence that the first Roman embankments appeared outside Greek and Carthaginian towns, which may be assumed to have had reasonably sophisticated defences.

If the height of the embankment varied with its intended purpose, so too, apparently, did its frontal relationship with the enemy wall. It is fairly clear that the embankment at

Avaricum abutted the wall (Caes., *Bell. Gall.* 7.24: “almost touching the enemy wall”, prior to completion; 7.27), or at any rate came close enough to permit ladders to be planted against it; here is another reason to reject Napoléon’s scheme, which shows a 20-metre gap (fig. 33). The final embankment at Jotapata will have been similar, as Titus and his picked assault-team “set foot upon” the walls from it (Jos., *Bell. Jud.* 3.324). However, it is worth noting that an assault launched along the previous version of the embankment required the use of gang-planks (*mēchanai epibatērioi*: Jos., *Bell. Jud.* 3.260) to convey the troops through the breach.

This neatly highlights a peculiarity of embankments designed for battering-rams. It seems likely that a gap was deliberately left between the embankment and the wall, so that the debris from the battering did not accumulate under the ram, where it might eventually interfere with the free operation of the machine and would certainly obstruct the passage of infantry through the resulting breach. Josephus preserves an interesting nugget of information during Titus’s siege of Jerusalem, when he records that the engineers (*tektones*; cf. Apoll., *Pol.* W 138) measured the gap between the embankments and the wall to see if the battering-rams would reach (*Bell. Jud.* 5.275); the battering commenced without any more ado.

Titus’s siege of Jerusalem, with its artificial and natural defences (fig. 22), will have presented problems similar to those at Jotapata. Titus first took the precaution of leveling the ground from the north of the city (Jos., *Bell. Jud.* 5.106-108), perhaps to facilitate the passage of heavy machinery in the Hellenistic tradition (above, p. 135), but also to ensure the unimpeded advance of the army. He then erected three embankments against the so-called “Third Wall” (*Bell. Jud.* 5.263), deployed battering-rams (*ibid.*, 275), and set up siege-towers to protect the workers (*ibid.*, 292). As at Piraeus, the embankments were perhaps intended to elevate the rams above the massive foundations, which were said to be ten cubits (4.6 m) thick (*Bell. Jud.* 5.153-154).

There is no mention of embankments in Titus’s assault on the second wall (*Bell. Jud.* 5.317), and the terrain within the town was perhaps level enough for the machinery. However, when he turned his attention to the Temple platform, it was clearly necessary

to achieve elevation. The Antonia fortress sat at the north-west corner of the Temple platform, on bedrock which was around 11 metres thick, rather than the 50 cubits (23 m) which Josephus claims (*ibid.* 5.238), but still tall enough to require the construction of two embankments; in addition, the northern approach was screened by the Struthion pool, which a besieger was obliged to bridge. The approach to the Temple platform was equally difficult from the west, where it rose up above the deep Tyropoeon Valley (*ibid.*, 5.140), necessitating two embankments here, also (*ibid.* 5.356-357). When these were destroyed (*ibid.*, 5.469-470, 490), four new ones were erected at the Antonia (*ibid.*, 5.523), and finally a single broad approach-road was cleared through the ruins of Antonia and up into the Temple enclosure (*ibid.*, 6.93).

Connolly has suggested that, in referring to pairs of embankments at each location, Josephus means the two sides of a single embankment (Connolly 1983, 88). Josephus says that the final two embankments at the Temple were thirty cubits (13.9 m) apart, and those at Antonia were twenty cubits (9.24 m) apart (*Bell. Jud.* 5.467). Following Connolly's hypothesis, these will have been the widths of two embankments, yet Josephus pointedly comments that they were immense (*ibid.*). Even taking these dimensions as referring only to the central filling, and allowing for the additional widths of the side structures, they still seem rather narrow compared with Caesar's 330-foot (97.6 m) wide embankment at Avaricum.

A similar argument was long ago deployed in favour of a single embankment at Massilia (Jullian 1900, 337), but foundered for the same reason as Connolly's; namely, that the two sides of a wide embankment are not themselves separate "mounds", but integral parts of the same structure. Holmes has also pointed out, in refuting the argument of Jullian, that one wide embankment effectively infilled the vacant gap between two separate embankments, hence it would have meant more work (1911, 605); he could have added the objection, that it would have required more raw material, too.

Titus's first embankments against the Temple platform were destroyed by fire, a feat which was attempted during several other sieges (above, p. 141). This apparent combustibility has encouraged a peculiar theory "based on the fantastic assumption that the

structure [of an embankment] was not solid, but contained galleries” (Holmes 1911, 600). Liebenam was cautious, remarking only that “its structure was ... not entirely compact, but had cavities which allowed the flow of air, and perhaps even formal covered galleries” (1909, 2242: “sein Gefüge war wohl ... nicht vollkommen dicht, sondern hatte Höhlungen, die einen Luftzug zuließen, vielleicht auch förmliche gedeckte Galerien”). Saglio believed that such a gallery was in evidence on scene CXVII (fig. 44, extreme top right) of Trajan’s Column (1877, 142: “On remarque une sorte de voûte formée de poutres disposées en arc-boutant et peut-être destinée à protéger un de ces chemins couverts, *cuniculi*, par lesquels on pouvait faire avancer des sapes et des mines jusqu’aux murs”), but the “type of vault formed by beams laid out like struts” requires the eye of faith (cf. Lepper & Frere 1988, 168, where the figures at top-right are not even mentioned; however, I have argued above, p. 70, that the subject of the main scene is, indeed, the frame of an embankment).

Wimmel believed that the embankment was constructed in layers, and that the workers brought forward the materials for the current layer through a line of protective sheds (1974, 10-11). He then invented the elaborate scheme that, when one row of sheds had fulfilled its purpose, rather than withdrawing them for re-use on the next layer, they were simply buried when more material was shovelled on top, thus creating *de facto* galleries within the structure (Wimmel 1974, 20-30). This method of construction is unlikely (see below), but Wimmel was influenced by a desire to explain Caesar’s enigmatic “*aperti cuniculi*” (below, p. 192) as tunnels within the embankment. It is sufficient to note, with Holmes (1911, 601), that such an embankment would not have been strong enough to carry the host of soldiers and machinery normally deployed on top.

Liebenam also appears to suggest (above, p. 143) that the embankment advanced layer-by-layer; if, by this, he means that the lowest stage of the embankment had reached the wall before the next layer was piled on top, then he is surely wrong. Such a scheme would continually have exposed men to danger at the wall foot, as they gradually built that section up. Rather, the work will have begun out of missile-range of the town, and probably proceeded much as Colonel Stoffel envisaged, with the front always sloping down towards the enemy (above, p. 141), except that the timber-work existed only at

the sides, and the rubble infill was thrown on in basketfuls (cf. Richmond 1982, 23-25, for earth-moving by Roman troops.) Corroboration of the gradual advance theory comes from Josephus's description of Titus's embankments "progressing forwards" at Jerusalem (*Bell. Jud.* 5.446), a nuance that is lost in Williamson's translation (1981, 325: "nearing completion"). (Cf. Appian, *Hisp.* 48, on Nertobriga.)

Holmes proposed more or less this scheme at Avaricum (1911, 140), although with Napoléon's timber-only tripartite structure (fig. 33) in mind. He observed that "to complete the final section of the work was always a difficult and troublesome operation", and recommended that men stationed at the forward edge of the advancing embankment, and suitably protected, "shot earth, timber, and fascines into the vacant space until the mass reached the necessary height" (*ibid.*, 144). Consequently, an unfinished embankment will have resembled a free-standing platform, some distance from the enemy wall. Such a structure has been identified at Cremna, bridging the narrowest point of the valley which fronted the city walls (Mitchell 1995, 180; cf. fig. 29). The surviving mound, composed of earth and stones, extends some 120 m from west to east, and the base spreads to a width of 140 m; the excessive spread, particularly to the south, may be attributed to the absence of timber, as a properly revetted embankment would have retained a narrower basal width and more strictly oblique sides. Sloping up at an angle of 18°, it reaches a height of 15 m above the valley floor, but halts 20 m from its objective (*ibid.*, 182).

Originally, the excavator believed that "the purpose of building the mound was to provide a firing platform for the attacking force" (Mitchell 1989, 317), an interpretation perpetuated in a later re-examination (Davies 2000, 155: "Mitchell is correct to stress the role of this mound as an artillery platform"). Of course, no precedent can be invoked for such a theory, and it must be admitted that the obvious interpretation of the mound is as an embankment under construction, as the excavator later conceded (Mitchell 1995, 182: "it was almost ready to have served as a ramp, from which an infantry assault could be mounted at and over the city wall"). Indeed, although Mitchell has not published a section through the mound, his description nicely illustrates the constructional sequence presumed by Stoffel and Holmes: the work will have proceeded

gradually from the west, as the workers cast earth and stones into the void in front of them; the accumulation of material will have created a mound whose apex, at each stage, moved further east, and whose eastward slope was steeper than its western approach. When it was abandoned, the Cremna embankment had probably reached its intended height, at wall-foot level, and it remained only to fill the vacant space and bring up the battering-ram.

Davies has pronounced the 20 m gap “inexplicable”, if the structure was intended to be an assault-ramp: “the first basal stage should have been extended much closer to the foot of the defences”, he writes (2000, 156), “in order that the infilling process could have been swiftly completed once the wall breach had been effected by the ram encased within the tower or shed on top of the mound”. It is unnecessary to refute an argument, based on the mistaken belief that a battering-ram could have operated more than 20 m away from its target. Additional proof that a ramming attack was ultimately intended is provided by the defenders’ counter-measure, for they had buttressed the town wall with a “counter mound” of their own, measuring 70 m by 15 m at the base and obviously intended to reinforce the curtain against battering (Mitchell 1995, 182).

Another unfinished embankment was identified at Machaerus, where Josephus records that the valleys surrounding the hill “could not easily be crossed and were entirely impossible to fill in” (*Bell. Jud.* 7.167), but that Lucilius Bassus “decided to make the approach by filling up the valley from the east and commenced the works, labouring to raise the embankment (*chōma*) with all speed, and thus make the siege easier” (*ibid.* 190). In fact, archaeology proves that Bassus’s embankment lay to the west of the fortress, where the approach is more gentle on account of a wide saddle linking el-Mishnaqa with the surrounding heights (fig. 25). Here, the excavator discovered a structure, consisting of rough field-stones bound with soil, 85 m long, widening from around 15 m at the tail end to around 35 m where it reached the lower slopes of el-Mishnaqa (fig. 34). As at Cremna, though on a smaller scale, the widening is largely due to the spread of rubble supporting the increased elevation, and the crest of the embankment will have remained a constant width of 10-12 m. The height of 12-14 m is the maximum, measured where the embankment fills the ravine (Strobel 1974b, 156; cf.

1974a, 107). The excavator drew particular attention to the apparent absence of wood remains (*ibid.*, n. 94), which again strikes a chord with Cremna.

Strobel has estimated that Machaerus stood 40 metres higher than the saddle; the Roman embankment reduced this difference to around 25 m, but, beginning some 140 metres away from the town, it was abandoned while still 50 m short of its goal (Strobel 1974b, 156-157). There is a bulge, half way along on the north side (less so on the south), which perhaps indicates that an obstacle was negotiated at that point; the excavator suggests that there may originally have been a defensive ditch here, now filled with eroded material from the hill (1974b, 157). Owing to the unfinished nature of the structure, it is difficult to discern its intended design, and we cannot say whether it was aiming for the wall base or the battlements.

Probably the best-known embankment, and the one which continues to influence scholars' ideas about construction and use, is at Masada. There, Silva earmarked a ridge known as the Leukē (usually identified as a bump at the base of the embankment; cf. figs. 35 and 55), and "ordered the troops to pile up rubble; working willingly and with many hands, a solid embankment (*chōma*) was raised to (a height of) two hundred cubits (92.5 m)" (Jos., *Bell. Jud.* 7.306). At this location, there is a saddle running from the west up to Masada, and creating a natural watershed between the northern Wadi Nimre and the southern Wadi Sebbe; indeed, Josephus says that the ascent was easier here than by the Snake Path in the east (*Bell. Jud.* 7.281), and must have been fairly accessible for Herod to have taken the precaution of erecting a watch-tower somewhere to the west (*Bell. Jud.* 7.293; Hawkes 1929, 199, is certainly wrong to imagine that the tower lies beneath the Roman embankment; cf. Lammerer 1933, 167). However, the steep gradient surely disallows the "carriage road" which Richmond envisaged (1962, 142), and probably permitted only pedestrian traffic.

A recent geological survey has proven that this western saddle was "an elongated, funnel-shaped spur ... 225 m long, 200 m wide at its widest and 50 m wide at its narrowest, lower part" (Gill 1993, 570). In fact, von Lammerer had already shown that the saddle rose from the Leukē to a spot some 20 m below the fortress wall (fig. 35); Gill calcu-

lates the shortfall to be 13 metres (1993, 570). Von Lammerer considered that the Romans had simply piled up 25 or 30 metres of material to create the required slope (Lammerer 1933, 168-169), explaining Josephus's inflated figures as being, not the height of the Roman construction, but the height of the entire slope, most of it natural, above the Wadi bottom (*ibid.*, 171). It was he who noticed wood fragments projecting from the sides, and concluded that there had been a timber skeleton supporting the structure.

Josephus claims that, as the Romans were not content with the stability of the 200-cubit (92.5 m) embankment, "a *bēma* was built on top of it fifty cubits (23 m) wide and the same high, by fitting together large stones" (*Bell. Jud.* 7.307). This structure is often misinterpreted as a "platform", which is admittedly the usual meaning of the word (Liddell *et al.* 1940, 314 s.v. βήμα), but Williamson's "pier" (1981, 397) cannot be right; it is true that *bēma*, "a raised place", has connotations of stepping up, but an embankment cannot have been stepped at the apex, otherwise Silva's wheeled tower would have been obstructed before reaching the end. The "step" must have extended along the entire crest, in the manner of cladding.

Yadin (wrongly, in my opinion) envisaged a "high platform which was built at the top of the ramp" (1966, 226; followed by Gill 1993, 570; cf. Goldsworthy 2000, 142: "originally, the top was surmounted by a wooden platform which allowed the battering ram, mounted in a siege tower, to be brought against the wall"), but Hawkes correctly interpreted Josephus's "platform" as "a stone causeway, 75 feet high and as broad, erected up the crest of the *agger*" (1929, 199). It is not clear why Richmond proposed "a crowning width of 50 ft" (1962, 154), when Josephus (and Hawkes) specified 75 feet. No trace has ever been found of this stone cladding, which von Lammerer took to be a 25 metre-thick layer coating the top surface (1933, 169), but the *bēma* may just be Josephus's way of describing the *agger* which the Romans added to the natural spur in order to create a usable ramp. Note that the artificial element is "25-30 m high in the central part of the ramp" (Gill 1993, 569; cf. Lammerer 1933, 169), which is fairly close to Josephus's 50 cubits.

No ancient authority describes the trackway along the top of an embankment. Richmond prescribed “some kind of rack or corduroy” (1962, 154 n. 70) at Masada, perhaps influenced by the rampart-walks on Trajan’s Column (Richmond 1982, 22), but such a bumpy track seems an inappropriate runway for a heavy siege-tower. The surface recommended by Trajan’s engineer, Apollodorus of Damascus, in his *Poliorkētika* will have been planked, rather than logged: “But if the ground beneath (the tower) is not level but has hollows, so we shall make a base (*hypothēma*) for the tower with the same combination (of beams?) as the tower itself, adapted to the slope of the ground and flattening the ground with its construction” (Apoll. W 173).

Every deviation from an even surface would make the task of advancing the tower that much more difficult, so the prime requirement would have been for a level runway with a smooth gradient. Josephus records that the *bēma* at Masada was made of large stones fitted together, emphasizing the necessity for a solid running surface. This was the downfall of Flamininus’s embankment at Atrax, which must have been one of Rome’s earliest experiments with this kind of structure; when a siege-tower was deployed, its wheels got stuck in a rut in the loose soil, and the machine listed violently. Clearly, Flamininus had not even rammed the surface, far less laid a timber runway.

According to von Lammerer, the gradient of the Masada ramp was 19° (1933, 169; cf. fig. 35); according to Gill, 17° (1993, 570). Connolly’s schematic plan (1983, 92) is generally reliable, although there is no particular reason to postulate a widened, horizontal working-area at the top; indeed, it was probably desirable to avoid any sudden changes in gradient, such as he shows at the top and bottom of his later reconstruction (Dobson 1989, 214-215; note that Dobson’s commentary incorrectly implies that the siege tower was not mobile, but had been built *in situ*).

No other archaeological examples are known. Yadin (1971, 192-193) thought he had discerned a Roman embankment on the southern side of Bettir, however examination by Ussishkin (1993, 95) has disproved this. Equally, the embankment claimed for Narbata by Zertal (1995, 84-87) is highly dubious. First, it is only 1 metre in height, and second, its supposed retaining walls, set approximately 4.5 metres apart, are neither parallel nor

of uniform construction; the “ramp” appears to comprise two separate features which may be boundary walls of some kind (Ussishkin 1993, 95 n. 2).

Finally, mention must be made of Davies’s attempt to divide *aggeres* into assault ramps (“any structure raised to parallel the height of a defensive work (or at least, to reach its base), enabling the passage of storming parties and/or the mounting of engines capable of effecting a breach”; 2001, 220) and siege mounds (“a structure raised to parallel or overtop a defensive work allowing oversight of the defenders and the advantageous emplacement of artillery”; *ibid.*). Although the ancient sources draw no such distinction, Davies believes that “the different tactical functions performed by these two structures should encourage us to adopt a stricter semantic approach in contrast to the cavalier manner in which ‘ramp’ and ‘mound’ have been employed hitherto” (2001, 220). But the examples which he offers are forced and unconvincing: the *aggeres* at Massilia, which “sound like assault ramps, but the fact that no mention is made of any rams, that towers are raised on the same and that the structures do not seem to have been raised to equal the height of the enceinte, does seem to suggest that these should be regarded as siege mounds instead” (2001, B84); or the deployment of towers on the *agger* at Jotapata, which “effectively converted the assault ramp into a siege mound” (2001, B107).

Of course, the heaping up of rubble implies no uniformity of purpose: the differing intentions of the embankment-builders at Carthage and Cremna, for example, should warn against making sweeping generalisations. Equally, the way in which an embankment could change function, as at Jotapata and Praaspa, indicates an inherent flexibility. But it is the physical nature of the embankment that remains problematic (cf. Noviodunum, p. 138), not whether it was “the direct agent of reduction” or simply a “supporting tool” (Davies 2001, 220). It is true to say that the nature of the embankment depended as much upon the nature of the enemy defences as upon the nature of the proposed attack. Veith despaired of ever formulating “a universally applicable constructional model” (1928, 444: “Bei dieser weitgehenden Abhängigkeit vom Angriffsplan und Gelände läßt sich überhaupt nicht an ein allgemein gültiges Konstruktionsschema denken”), but such a model seems inappropriate in any case.

Part 3:

The Machinery of Roman Siegecraft

Siege apparatus could take many forms, depending upon its purpose, although the historical sources often refer simply to “machinery”. We hear of various devices for elevating assault troops to wall-height, from the humble ladder and its variations, to the mobile tower with draw-bridge, and various battering machines for breaching walls. But, for detailed descriptions of these, we are indebted to a handful of specialists.

The earliest of these is Philon of Byzantium, whose “Mechanical Compendium” (*Mēchanikē syntaxis*) includes sections on the construction of artillery (*Belopoiika*) and on siegecraft (*Poliorkētika*), drawing upon personal experience in the technologically advanced cities of Rhodes and Alexandria in the later third century B.C. Heron of Alexandria preserves interesting remarks on artillery in his *Belopoiika*, probably written during the reign of Nero, but four other authors are of prime importance for siegecraft studies: Vitruvius, Athenaeus, Apollodorus, and Vegetius.

Vitruvius’s text is securely dated to the late first century B.C. (e.g., Rowland & Howe 1999, 5-6), through his links with Julius Caesar, Octavian and, later, Octavian’s sister, Octavia; interestingly, he says that, along with three colleagues, he was charged with “the construction of *ballistae* and *scorpiones* and the repair of other artillery” (*De arch.* 1.praef.1-2). Unfortunately, there is no such certainty with Athenaeus. Schneider muddied the waters by lending his (posthumous) authority to a Hadrianic date, on stylistic grounds (Schneider 1912, 2), but the identity of the “most revered Marcellus” to whom

Athenaeus dedicated his treatise (W 3) is the key to the dating. The main contenders are the conqueror of Syracuse, and the emperor Augustus's son-in-law; the argument of Cichorius (1922, 276) for the latter is attractive, but unfortunately inconclusive.

Curiously, much of Athenaeus's work appears, sometimes abbreviated, sometimes supplemented, in the tenth book of Vitruvius's *De architectura*. In particular, each includes a selection of wheeled sheds, the so-called *testudines* (*chelōnes*), introduced by Vitruvius as "that which I have learned from my teachers and which appears useful to me" (*De arch.* 10.13.8). Athenaeus gives no attribution for the material, but his earlier statement, that "we shall run through what we have read on our subject by the engineer Agesistratos" (W 7), may apply particularly to this section. Agesistratos was certainly one of Vitruvius's sources (*De arch.* 7.praef.14).

We are on more secure ground with Apollodorus of Damascus, whose name is inextricably linked with the emperor Trajan. He built the famous Danube bridge which Trajan's armies utilised in the Second Dacian War of A.D. 106 (Procop., *De aedif.* 4.6.13), and was subsequently responsible for Trajan's Forum and probably the Column itself (cf. Lepper & Frere 1988, 187-193). His treatise on siegecraft (*Poliorkētika*) is addressed to an unnamed emperor, with whom he had previously served in combat (W 138), a scenario which comfortably fits the Dacian Wars of Trajan; the theory that the work was dedicated to Hadrian, often accepted uncritically (e.g., Gilliver 1999, 176), is at best unproven (Ridley 1989, 560).

Finally, the *Epitoma rei militaris*, compiled by Vegetius at some point in the later fourth or early fifth century, is relevant for its section on siege warfare (4.1-30), thought to derive from the lost *Tactica* of Frontinus (Lammert 1938, 399-401; Lendle 1983, xxi). It is interesting that, in his *Strategemata*, Frontinus eschews discussion of *opera* and *machinamenta*, on the grounds that their development has long since peaked (*Strat.* 3.praef.), but this need not preclude him from having discussed the subject in a separate work.

Chapter 5:

The use of artillery in the Roman era

When the turncoat, Labienus, was trying to dislodge the Caesarian garrison from the town of Leptis in 46 B.C., one of his decurions was pinned to his horse (or, according to a variant reading, to the ground: Harmand 1971, 226) by a *scorpio* missile (*Bell. Afr.* 29). The town was said to be easily defended, on account of the quantity of artillery (*tormenta*) which it possessed, and the same trend can be discerned in towns elsewhere.

Artillery, as with other elements of siege-machinery, was introduced to the Mediterranean world during the Carthaginian conflict with Syracuse in the later 5th century B.C. Initially utilising an oversized composite bow as its source of energy, the design of the catapult was transformed by the discovery of the torsion principle, and torsion arrow-firers and stone-projectors were present in the arsenals of major towns and cities by the third century B.C. (cf. Baatz 1999a, 340; Marsden 1969, 73-77).

The subject as a whole is often poorly understood in the modern literature (e.g., Southern & Dixon 1996, 152, where it is assumed that Vitruvius is of relevance to the later period; Strobel 1974a, 109, for the *onager* in Flavian times), and areas of contention remain, so that, besides exploring the place of artillery in siegecraft, a brief technical overview is desirable.

1. The construction and use of ancient artillery

1.1 The 3rd century B.C.

By the time of Philon of Byzantium, Hellenistic engineers had devised a set of constructional principles for the arrow-firing catapult, and a separate set for the stone-projector, on account of differences in design. These constructional rules meant that, in theory, catapults of any size could be constructed (cf. Baatz 1999a, 341-342; Marsden 1969, 24-39). Because individual machines were tailored to the size of their intended ammunition, arrow-firers were designated according to the length of the arrow. Thus, a “four-span” (or “two-cubit”) catapult was designed to fire an arrow 0.92 m (i.e., 4×0.23 m, or 2×0.46 m) in length. Similarly, a “ten-mina” stone-projector was designed for shot weighing around $4\frac{1}{2}$ kg (i.e., 10×0.4366 kg).

In torsion weapons, the energy for propelling the missile was stored in two torsion-springs, held upright and parallel in a metal-reinforced frame (*plinthion*). Both springs required a distinctive bronze washer (*choinikis*) at each end, through which the spring-cord was stretched; this is often the only recognisable vestige of a catapult (cf. figs. 37-38). The washer was intended to turn in the torsion-frame, twisting the spring to add additional, last-minute torsion. Because the spring-cord was so sensitive, the springs would only have been tensioned immediately prior to use, and slackened off afterwards. (A typical arrow-firing catapult is shown in fig. 36a).

The crucial factor in catapult design was the energy storage capacity of the torsion-spring (i.e., the mathematical volume of the notional cylinder formed by the torsion-spring). Consequently, it is not surprising to find that, in their calibration tables, the Hellenistic engineers utilised the spring-diameter (*diametros*, defined as the inner diameter of the washer) as the basic unit of measurement for any given catapult. Thus, for example, Philon (*Bel.* 12 = W55) records that the arrow-firer’s torsion-frame should be $6\frac{1}{2}$ spring-diameters wide by $5\frac{1}{2}$ spring-diameters tall. The bow-arms should be 7 spring-diameters, the case 16 spring-diameters, and the projectile 9 spring-diameters in length. For our two-cubit catapult, the inner diameter of the washer was 10.28 cm, and

all of the other components were sized accordingly. (Nine times 10.28 cm gives the missile-length of 0.92 m, or two cubits.)

The design of the stone-projector was only superficially similar (cf. fig. 36b). First, the bow-string was replaced by a band, because of the nature of the projectile. Second, because of the weight of the projectile, the machine was required to exert greater energy; this was achieved, not only by making the average machine larger overall, but also by redesigning the torsion-frame to offset the springs and allow the bow-arms to recoil further. The technical designation for the arrow-firer was *euthytonon*, or “straight-springs”, while the stone-projector was known as a *palintonon*, or “bent-springs”, because of the configuration when viewed from above (cf. Marsden 1969, 22-23). In everyday parlance, the arrow-firer was simply called the *katapultēs oxybelēs*, on account of the “sharp missile”, while the stone-projector was called the *lithobolos* or *petrobolos*.

Besides a general increase in size, the construction of the stone-projector was rather more complex. In simple terms, the “stock” of the machine was proportionately shorter and wider, to accommodate a differently sized projectile, and the larger torsion-frame was manufactured as two separate springs with connecting spars and rearward bracing. In keeping with this increased complexity, a more involved mathematical formula was used to calculate the sizes of all the individual components. Whereas the arrow-firer’s spring-diameter was simply one-ninth of the intended missile length, the stone-projector’s spring-diameter, expressed in dactyls (i.e., $\frac{1}{24}$ cubit), was 1.1 times the cube root of the intended missile weight in minas (i.e., $\frac{1}{60}$ talent) multiplied by a hundred.

$$D = 1.1 \sqrt[3]{(100 M)}$$

Thus, for our ten-mina stone-projector, the spring-diameter was

$$1.1 \times \sqrt[3]{(100 \times 10)} = 1.1 \times \sqrt[3]{(1,000)} = 1.1 \times 10 = 11 \text{ dactyls} = 21.2 \text{ cm}$$

Philon supplies a list equating standard projectile weights with the corresponding spring-diameters (Philon, *Bel.* 6 = W51; cf. Marsden 1971, 158 n. 11), which would

have saved contemporary engineers the trouble of calculating complicated cube roots. As with the arrow-firer, all other components were expressed as multiples or fractions of the spring-diameter; for example, the bow-arms were to be 6 spring-diameters long, the ladder 19 spring-diameters long, and the torsion-frame $7\frac{1}{2}$ spring-diameters high.

A remarkable discovery was made at Ephyra, in the ruins of a fortified tower destroyed by the Romans in 167 B.C.: twenty-one catapult washers, originating from seven machines of varying antiquity (Batz 1982, 213; 217). The largest washers, forming a complete set of four, have an inner diameter of 13.6cm (fig. 37.2), indicating a missile-length of 1.22 m, or four Greek feet (*ibid.* 219-220). A four-footer arrow-firer would have been considered a fairly heavy-duty weapon. Batz does not explore the possibility that this might have been a stone-projector, stating that “even the smallest stone-thrower had significantly larger washers” (1982, 223: “selbst die kleinsten Steinwerfer hatten wesentlich größere Spannbuchsen”), but it is worth pursuing this further.

The stone-thrower formula requires that we know the weight of the missile in minas. However, the converse, working from the *diametros* D (i.e., the inner diameter of the washer), expressed in dactyls, is:

$$D^3 \div (1.1)^3 = 100 M$$

or, put another way

$$M = (D^3 \div (1.1)^3) \div 100$$

Thus, for our 13.6 cm washer (i.e., $D = 7$ dactyls), the missile weight (in minas) was

$$M = (7^3 \div (1.1)^3) \div 100 = (343 \div 1.33) \div 100 = 257.9 \div 100 = 2.58$$

So, the largest Ephyra washers could, in theory, have come from a stone-projector designed for missiles weighing approximately $2\frac{1}{2}$ minas (1.125 kg), but it seems peculiar to have specifically designed a machine for such small projectiles. Indeed, as Batz has

pointed out (1982, 223 n. 30), Philon begins his list of common stone-projector calibres at 10 minas (*Bel.* 6 = *Th.* 51), which corresponds to a *diametros* of 21.2 cm; this is a far cry from the 13.6 cm Ephyra washer.

However, the existence of a *katapaltēs petrobolos kai oxybelēs tetrapēchus*, designed by Bromius and stored in the Erechtheium at Athens in 307/6 B.C. (*I.G.* II² 1487B), sheds an interesting light on the matter, as it seems to indicate a four-cubit arrow-firer which was also capable of throwing stones (cf. Marsden 1969, 70; Garland 1974, 216). A four-cubit arrow-firer was built around a *diametros* of $10\frac{2}{3}$ dactyls (20.6 cm), which is only marginally smaller than the ten-mina stone-projector. Thus, it is likely that Bromius's machine was a *palintonon* (above, p. 160), which happened to be the correct calibre to fire large four-cubit (1.85 m) missiles; it would have been a simple matter to exchange the bow-string, and the wide slider need not have presented a problem (*pace* Marsden).

It is noteworthy that the remaining three catapults on the inscription, two three-cubit machines and a three-span, are described as arrow-firers; their sliders were designed for arrows and, at 2-4 cm wide, will have been too narrow to take stone-shot. Thus, the fact that they are not credited with the same dual capability as Bromius's machine is entirely down to their design. It does not necessarily imply that the four-cubit machine represented the smallest possible calibre of stone-projector (*pace* Baatz 1982, 223 n. 30); only that this was the smallest one in the Athenian inventory of 307/6 B.C.

It is theoretically possible for a four-foot machine, like the one from Ephyra, to have been designed as a *palintonon*, with a wide slider for $2\frac{1}{2}$ mina shot, but it is purely conjectural that such a machine ever existed. Actual finds of missiles tend to suggest that Greek engineers of the third and second centuries preferred larger calibres of stone-shot (cf. Table 19, p. 185). Only at Tel Dor has any significant proportion of small shot been recovered (Shatzman 1995, 61), and the absence of anything remotely similar from the great arsenals at Pergamum and Rhodes must be significant.

Marsden noted that "the Romans were certainly familiar with artillery by the time of the first Punic War" (1969, 84), but familiarity should not be confused with expertise, and

certainly does not imply ownership. He cites a passage of Frontinus (*Strat.* 1.4.1), in which the consul for 282 B.C., Q. Aemilius Papus, came under artillery-fire from the Tarentine fleet. Of course, Tarentum, home of Pythagorean mechanics, was at the forefront of artillery development, whereas there is no question of Papus possessing artillery. Marsden also cites a story, current in Augustan times, that M. Atilius Regulus carried artillery in his African expedition of 256 B.C., but this is historically doubtful.

We can be quite sure that the Romans were not yet equipped with artillery during the First Punic War. Besides the fact that it figures in none of Polybius's siege narratives, there was an occasion when a Roman flotilla, intimidated by a stronger Carthaginian fleet, beached and sought the protection of the arrow-firers and stone-projectors belonging to a nearby coastal town (Polyb. 1.53.10-11). They clearly had no catapults of their own, whereas the Sicilians enjoyed the benefit of a century of artillery development. In this context, Diodorus's report of a single stone-projector at Lilybaeum in the 240s is more than a little suspicious (Diod. Sic. 24.1.2), although Hiero of Syracuse could have been the source of the siege equipment which the Romans used here. If the story is true, it simply demonstrates the ineptitude with which the Romans handled the new weapon at this early date.

Artillery suddenly appears in Roman hands around 210 B.C. as a naval weapon, first aboard Laevinus's ships at Anticyra, then possibly in support of Scipio Africanus at Cartagena; it is found some years later with the relieving flotilla of Fabius Maximus at Tarentum, and finally with Scipio at Utica. The "artillery and machinery" which Cincius Alimentus requisitioned from Sicily in 208 B.C. (above, p. 23) was probably captured Carthaginian war material. Catapults had figured in the ovation of Marcellus in 211 B.C. (Livy 26.21.7), no doubt taken from Syracuse, and some of these, along with the 470-odd catapults captured at Cartagena, will have found their way onto the fleet. Roman stores of artillery will have been further replenished with the booty from campaigning in Aetolia: Fulvius's triumph in 187 B.C. apparently included the parading of *catapultae*, *ballistae*, and *tormenta omnis generis* (Livy 39.5.16).

It is noteworthy that, when the Romans finally began using artillery, it was requisitioned from Syracusan sources, long associated with artillery manufacture, or confiscated from Carthaginian stores and Greek towns. This is not surprising, given the highly complex manufacturing process. As Marsden has noted, “an inexperienced mechanic had little chance of producing an efficient [machine]” (1969, 24). It is also of interest that the weapon first appears in connection with the fleet. Garlan has observed, in the context of the 4th century Syracusan catapults, that transport of such cumbersome machines by road would have been troublesome; consequently, the fact that reports of their use tend to concentrate on coastal sites may not be entirely coincidental (Garlan 1974, 168).

By now, mural artillery had become common in towns of the Mediterranean world. The Capuans were able to repulse a Roman attack in 211 B.C., using *ballistae* and *scorpiones* positioned at the gates (Livy 26.6.4), and while assaulting Locri in 205 B.C. Hannibal narrowly avoided a *scorpio* missile fired from the walls (Livy 29.7.6). Finally, stone-projectors were particularly prominent in 200 B.C., defending the walls of Abydus against the ship-borne machinery of Philip V (Polyb. 16.30.4).

1.2 The 2nd & early 1st centuries B.C.

At Delminium in 156 B.C., Marcius Figulus had two-cubit catapults (*katapeltai*), which he used to fire incendiary arrows into the town. The use of artillery to fire incendiary projectiles was common in Hellenistic siegecraft, though usually directed at the besieger by the besieged, as recommended by Philon (*Pol.* 3.41 = Th. 94). The defenders of Tyre had used this stratagem against Alexander in 332 B.C. (Arrian, *Anab. Alex.* 2.21.2), and similarly the Rhodians against Demetrius in 304 B.C. (Diod. Sic. 20.96.6-7), to quote only two examples. The arrow-firers and stone-projectors which Scipio Aemilianus allegedly stationed in the towers along the circumvallation at Numantia in 133 B.C. were not loaded with incendiary missiles, as far as we know, but they represent the first occasion, after Delminium, that artillery is found in Roman hands. And the last, until the Jugurthine War, thirty years later.

A complete torsion-frame with four washers was discovered in 1911 at Ampurias (Spain) and dated broadly to the later second century (Pitollet 1920, 74; Baatz 1980b,

288). This first ever find of ancient artillery was immediately appreciated by Schramm, who reconstructed the machine (1918, 75-76; cf. fig. 36a), and it remains a mystery why Marsden hardly mentioned it in his study of ancient artillery. The wooden frame was reinforced with iron fittings, as recommended by Philon (*Bel.* 16 = Th. 57), primarily to brace the timber components, but also to afford some protection against enemy fire.

The washers (fig. 37.4) have an inner diameter of 7.9 cm, a calibre which lies midway between 2½ feet and 3 spans. Nevertheless, Schramm demonstrated that the machine was intended to be a three-span (missile-length: 0.69 m), but was “under-sprung” (1918, 43). Vitruvius gives the example of a machine whose torsion-frame is not as high as it should be, an effect which he terms *catatonum*, and recommends the consequent lengthening of the bow-arms to compensate (Vitr., *de arch.* 10.10.6).

Marsden envisaged the Roman commanders of the period employing the same equipment as the contemporary Hellenistic generals, but on a more modest scale (Marsden 1969, 176); however, the Macedonians and the Seleucids routinely fielded quantities of artillery, whereas it is noticeably absent from Roman operations of the second century. This cannot have been for want of artillery-pieces. Even if the five hundred catapults taken from Cartagena in 209 B.C. were no longer serviceable, a Roman commission headed by Scipio Nasica and Cornelius Hispanus had confiscated “roughly two thousand arrow-firing and stone-projecting catapults” from Carthage in 149 B.C. (Appian, *Pun.* 80). Marsden (1969, 110) blithely assumes that Scipio employed artillery in his assaults on Carthage in 147 and 146 B.C., but Appian makes no mention of it. In Marsden’s scenario, “[Scipio’s] artillery gave the normal covering fire”, but, as we have seen, such covering fire, at least from artillery, is conspicuously absent from Roman operations of the period.

Metellus had found the walls of Zama defended by artillery in 109 B.C. (Sall., *Jug.* 57.6), and Marius had employed artillery (*ibid.*, 94.3) in his assault on the fort at the Muluccha River, but it fades into the background again, until the time of Sulla. In 87 B.C., for his renewed attempt on Piraeus, Sulla constructed machinery in the workshops of Eleusis and Megara, and requisitioned artillery from Thebes (Appian, *Mithr.* 30). He

is not known to have used artillery previously, but we have seen that it was common in the town defences of the Greek world (above, p. 164), and the Thebans would have been keen to cement their alliance with Rome. It is not surprising to see Pompey equipped with artillery at Jerusalem in 63 B.C., as it had been standard equipment in the Greek east for almost three hundred years. He apparently borrowed the machinery from Tyre (Jos., *Ant. Iud.* 14.62; *Bell. Iud.* 1.147), where it is unlikely to have been Roman equipment stored in the city (*pace* Shatzman 1989, 465), but rather, like Sulla's Theban machines, a gift to ingratiate the townsfolk with the Romans. It is possible that artillery was frequently loaned in the Greek world, on account of its specialised construction, though there is no clear evidence of this (*pace* Marsden 1969, 176); but few towns would dare to refuse a request from the Roman army.

1.3 The later 1st century B.C.

As engineers became more familiar with artillery construction, further modifications were introduced between the time of Philon and the time of Vitruvius, and a new Latin vocabulary appears alongside the Greek: the term *modiolus* is used for the washer, *capitulum* for the torsion-frame, and *foramen* to indicate the spring-hole diameter (*diametros*); in general, stone-projectors become known as *ballistae*, arrow-firers as *cata-pultae*, and smaller examples of the latter as *scorpiones*.

One of the most important developments was the curving of the arrow-firer's bow-arms, which effectively increased the angle of recoil from 35° to 47°. Other changes were applied to the torsion-frame, which became narrower and taller (viewed from the front), and thus increased the power of the springs (Marsden 1969, 200-201). For any given washer-size, the Vitruvian arrow-firer must have been substantially more powerful than the Hellenistic version.

Changes were made to the stone-projector, also. Although the washers must still have been circular, like Philon's, the central hole appears to have been oval (Vitr., *De arch.* 10.11.4; cf. Marsden 1971, 200 n. 26 and fig. 8), which would have allowed more spring-cord to be inserted, thus resulting in a more powerful machine. Vitruvius gives a list of common calibres (*De arch.* 10.11.3, with Marsden's emendations: 1971, 197-200

n. 21), ranging from 2 *librae* (0.66 kg) to 360 *librae* (118 kg). The obvious extension of Philon's list of calibres at both ends has never drawn comment, but weights of 2 and 4 *librae*, roughly corresponding to 1½ and 3 minas, seem to have been a Roman innovation, judging by the presence of small shot at Numantia and Masada (see Table 19, p. 185). Unfortunately, in the final report from Masada, Holley never states the criteria by which he selected his study sample (Holley 1994, 353-355); he presents details of only 50 *ballista* balls out of the hundreds reportedly found by Yadin (1966, 156), and excludes stones which he considers "large [and] badly shaped", so we cannot be sure of a representative sample.

Archaeological remains again emphasize medium-heavy arrow-firers. The remains of two catapults were found at Azaila (Spain), buried in the destruction of the Celtiberian town in the 70s B.C. (Batz 1994c, 281), although apparently all but one washer is now lost (Vicente *et al.* 1997, 181 and 197 n. 14). The washer has a *foramen* of 9.4 cm, indicating that the machine was a two-cubit, or four-span, machine, firing an arrow of 0.85 m. The torsion-frame of a smaller machine from the same era was discovered at Caminreal (Spain), comprising the same elements as the Ampurias find (Vicente *et al.* 1997, 169-181). However, although the washers have an inner diameter of 8.4 cm, the torsion-frame was constructed using a *foramen* of only 8 cm, meaning that the washers must have overlapped the frame (Batz 1988). Batz attributes this to human error ("technische Murkserei"), noting that it may have been the result of an emergency repair. Finally, a shipwreck at Mahdia, off the Tunisian coast, dating from the second quarter of the first century, yielded washers from three different catapults. While two of the sets were already antiquated, and thus probably represent scrap, the remaining pair of washers display typological characteristics which fall between the Spanish finds and the Ephra finds; the inner diameters of 9.4cm and 9.5cm (fig. 37.5) indicate a missile-length of 0.85m, and the machine was probably a two-cubit arrow-firer (technically 0.92m) (Batz 1985, 686-690), which was perhaps simply poorly made and underpowered.

It is only with Caesar's operations that we finally gain the impression of artillery as standard equipment. Hitherto used in a piecemeal fashion, it seems that arrow-firers, at

least, regularly accompanied Caesar's armies (cf. Marsden 1969, 177; Schambach 1883, 6-7).

Marsden is over-zealous in postulating catapults on Caesar's harbour mole at Brundisium, where none are attested (Marsden 1969, 170), but artillery appears in Caesarian hands elsewhere: in defence of *castella* (*Bell. Gall.* 2.8) and *castra* (*Bell. Afr.* 20; 31; 56); and on shipboard, in support of an amphibious landing (*ibid.* 4.25). But chiefly in siege warfare: at Avaricum, defending a beleaguered siege-tower (*ibid.* 7.25); at Alesia, in defence of the circumvallation (*ibid.* 7.81); at Uxellodunum, driving the townsfolk away from their water supply (*ibid.* 8.40-41); at Massilia, for clearing the battlements of defenders (Caes., *Bell. Civ.* 2.11; also 2.9, 14); and at Ategua, demolishing a wooden turret. The emergency at Gergovia, when artillery was used in defence of the Roman camp (*Bell. Gall.* 7.41), shows that it was readily available at all times.

Yet Caesar had to requisition artillery for use in Alexandria in 48 B.C., though where the machines came from is not specified (*Bell. Alex.* 1; cf. Holmes 1911, 583: "he was obliged to import engines from Greece or Asia"); in the sequel, one of his legions arrived with artillery (*Bell. Alex.* 9). Scipio Nasica had similarly requisitioned artillery, amongst other things, from the towns of Syria (Caes., *Bell. Civ.* 3.32). Of course, artillery was common in defence of towns (cf. above, p. 164), and is expressly mentioned at Corfinium (Caes., *Bell. Civ.* 1.17), Salonae (*ibid.*, 3.9), Alexandria (*Bell. Alex.* 2, 21), Leptis (*Bell. Afr.* 29), Ategua (*Bell. Hisp.* 19), and, of course, Massilia (Caes., *Bell. Civ.*, 2.2, 9, 14, 16), whose artillery Caesar confiscated (*ibid.*, 2.22).

Nor was Caesar the only one to make use of artillery at this time. Pompey used it at Brundisium, mounted on ship-borne turrets (Caes., *Bell. Civ.* 1.26), and had stored artillery-pieces within the town of Dyrrachium, some of which he deployed to hinder Caesar's siege-works (*ibid.*, 3.44-45, 63). Even Cicero used it at Pindenissus, allegedly in large quantity (*Ad fam.* 15.4.10) and no doubt procured from his province (cf. Schambach 1883, 8). Schambach has made the important observation that most of the artillery mentioned will have been lightweight arrow-firers (1883, 10; *contra* Marsden 1969,

175), and we can readily envisage the likes of the Azaila and Caminreal catapults (above, p. 167) being carted around by Caesar's legions.

1.4 The early Principate

The most intensively studied period for Roman artillery has been the Principate. It is generally accepted that catapults were now allotted to the legions on a regular basis (Marsden 1969, 179; Baatz 1994a, 128), and the increasing professionalism of the Roman army under Caesar and Octavian made it possible to support specialist artificers like Vitruvius and his associates, M. Aurelius, P. Minidius and Cn. Cornelius (Vitr., *de arch.* 1.praef.2) (cf. Stoll 1998, 230-240).

The construction of Roman artillery is first attested at a military workshop on the Auerberg (Germany), dating to roughly A.D. 20-40. Here, the excavator discovered fragments of at least fifteen casting-moulds, which would have produced washers with inner diameters ranging from 8.8 cm to 11.2 cm (Baatz 1984, 182). It is thought that all were intended to represent the same *foramen* of 4 *unciae*, or $\frac{1}{3}$ Roman foot (9.84 cm). The calibre will then have been 3 feet (i.e., 89 cm), corresponding to a medium-heavy weapon, like the two-cubit Azaila and Mahdia machines.

A cache of eight washers from Cremona divides into two sets, one with a *foramen* of 7.4 cm (fig. 37.7) and the other of 8.8 cm (fig. 37.10); the smaller certainly represents a three-span arrow-firer (Baatz 1980b, 295). However, far more exciting were the two bronze front-plates associated with the washers (*ibid.*, 288-292). These were intended to protect the torsion-springs from the front, and were highly decorative, each carrying an honorific inscription. One, belonging to the smaller washers, records that the catapult was put into commission in A.D. 45; the other, though fragmentary, may record the date A.D. 56. Both will have been destroyed in the fighting in A.D. 69, demonstrating that twenty-year old machines were still capable of giving service (*ibid.*, 296-297).

The only other archaeological finds of catapults dating from the Principate are the tiny washers from Elginhaugh (Scotland) and Bath (England) (Baatz 1994c, 282); both, on

account of their size (the Bath washer has a *foramen* of 4.0 cm: Baatz 1999b, 18 n. 54), are likely to have derived from hand-held weapons (Campbell 1986, 130).

Artillery is found deployed in support of river crossings (Tac., *Ann.* 1.56; 15.9; *Hist.* 2.34), in assaults against obstacles (Tac., *Ann.* 2.20), even in defence of camp (Tac., *Hist.* 4.23; Jos., *Bell. Jud.* 3.80; Hyg., *de munit. castr.* 58), but chiefly in siege warfare: at Celenderis, Mons Haemus, Vollandum, Jotapata, Gamala, Jerusalem, and Masada. During the Civil War of A.D. 69, the Vitellians are known to have deployed artillery on the roadway outside Cremona (Tac., *Hist.* 3.23): the pair of arrow-firers mentioned above will have been amongst the equipment which they abandoned in their retreat (*ibid.* 3.25); and, in addition, they had an enormous stone-projector which the Flavians managed to disable by cutting the torsion-springs (Tac., *Hist.* 3.23).

It is noteworthy that only this one *ballista* is mentioned, suggesting that, otherwise, the legions had brought only arrow-firers. Vespasian appears to have had a full complement of heavy stone-projectors at Jotapata (Jos., *Bell. Jud.* 3.166), but the one-talent machines of the Fifteenth Legion at Jerusalem were apparently larger than the other legions' *ballistae* (Jos., *Bell. Jud.* 5.269-270). It is unfortunate that a comprehensive study of the *ballista* balls from Masada was not attempted, as the Tenth Legion may well have used heavier calibres than Holley's figures suggest (see above, p. 167). The corpus of *ballista* balls from Gamala has never been published, but during a visit in 1984 I saw only relatively light calibres (cf. fig. 48); similarly, the *ballista* balls from Hatra, which are likely to be of Roman origin, seem small, on the whole (cf. figs. 58-60).

1.5 The 2nd and 3rd centuries

Arrow-firing artillery evidently underwent a remarkable change of design in the later first century, necessitating a fundamental shift in terminology that has often given rise to confusion (e.g., Holmes 1911, 583; Harmand 1967a, 90-91; Le Bohec 1989, 146-147). In short, at around the time of Trajan's Dacian Wars, the *palintonon* design principles, hitherto restricted to the stone-throwing *ballista*, were applied to a new kind of arrow-firer, which naturally attracted the same name. Instead of a narrow, wooden tor-

sion-frame, like the *catapulta* (fig. 36a), the new arrow-firer had a wide, open, all-metal torsion-frame (cf. Baatz 1999a, 342; Marsden 1969, 189).

This new design, as Marsden realised (1971, 209), is described in the enigmatic *Cheiroballistra* text, attributed to the first century writer Heron, but clearly of much later date (cf. Baatz 1978, 14). Although the text specifies a small, hand-held weapon, the components can be scaled up to produce a machine resembling those on Trajan's Column (fig. 41). The torsion-springs are separate, like those of a stone-projector, but instead of a heavy wooden frame, the washers of each spring sit in an iron frame (*kambestrion*), and the woodwork required to hold the stone-projector's springs in position is replaced by two horizontal iron struts, connecting the tops and bottoms of the *kambestria*. The upper strut (*kamarion*) has a distinctive arch halfway along, which Marsden interpreted as an aid to aiming the machine (1971, 227-228).

Apart from overall benefits accruing from its lightweight yet robust frame (cf. Baatz 1978, 13), the palintone arrangement of the springs, defining the machine as a *ballista*, will have increased its power, and setting the arms further apart allowed them to be drawn further back, thus storing more energy in the springs (Marsden 1971, 230, calculates 59°). The upper "arched strut" (*kamarion*), greatly assisting in targeting, betrays the identity of the artillery on Trajan's Column (e.g., scene LXVI; fig. 41), where the springs seem, in addition, to be enclosed in weatherproof cylinders. A single *kambestrion*, with associated washers (fig. 38.1), was discovered in Lyon, and it is an attractive hypothesis, advanced by Feugère (Baatz & Feugère 1981, 209), that it dates from the Battle of Lugdunum in A.D. 197; unfortunately, its context remains unknown and it could in fact be much later (below, p. 173).

At some point prior to A.D. 240, the stone-thrower was similarly redesigned, to judge from the example discovered at Hatra. The machine had been positioned on a tower on the wall circuit and was buried, face down, when the tower collapsed, presumably during the final Sasanian siege (above, p. 70). Only the bronze-sheathing of the torsion-frame, complete with three of the four washers, was preserved, showing it to have been

much wider and lower than the Vitruvian model, and apparently built as a single component, in contrast to the latter's separate springs (Baatz 1978, 7).

Hassall appears to favour a different design for the new-style catapults (2000, 339: "it seems likely that [the wide frame] reflects a different mode of operation"), but he does not elaborate. It is possible that he envisages the in-swinging arms suggested long ago by Victor Prou (cf. Hall 1956, 711), but this theory has never been demonstrated. (Note that Baatz's reconstruction appears to show in-swinging arms, but he does not mention this in the text: Baatz 1978, 3 fig. 2; 8 fig. 7.)

The Hatra washers (fig. 38.2) have an inner diameter of 16 cm, but the shorter torsion-springs necessitated by the lower field-frame mean that the Hellenistic calibration formula cannot be employed. Instead, Baatz calculated the mathematical volume of each Hatra torsion-spring to be 21.7 litres. He equated this with Vitruvius's 10-pound stone-projector: taking the *foramen* as 8 digits (14.8 cm), Vitruvius's spring height of $8^{11/16}$ *foramina* (i.e., $8.7 \times 14.8 = 128.8$ cm) then gives a spring-volume of 22.2 litres (Baatz 1978, 7). However, an 8-mina (roughly 10 Roman *librae*) stone-projector of Hellenistic manufacture would have had a *diametros* of roughly 10 dactyls, or 19.3 cm, and a spring-height of $8 \times 19.3 = 154.4$ cm, giving a spring-volume of 45.2 litres. A similar realisation led to Marsden's theory (1971, 197-200 n. 21) that Vitruvius's *foramina* should be understood as *unciae* ($1/12$ Roman foot) rather than digits ($1/16$ Roman foot), which gives the 10-pounder a *foramen* of 19.7 cm, a spring-height of 171.4 cm, and a spring volume of 52.2 litres.

This is clearly a larger spring than the Hatra *ballista*, which ought to suggest that the latter was of far smaller calibre. But the crux of the matter rests with Vitruvius's measurements. Baatz has argued that Marsden's interference with Vitruvius's text is "hard to accept" (1978, 16 n. 57), but there are wide-ranging implications: if Vitruvius's 10-pounder was based on a *foramen* of 14.8 cm, and not on Marsden's emended 19.7 cm, then, for some reason, the Roman machines were far more powerful than their Hellenistic predecessors. The Hatra *ballista* did not incorporate Vitruvius's oval washer hole (above, p. 166), so improved performance cannot be attributed to this; is it possible that

in-swinging arms lent the machine the extra power? Without experimentation, we cannot be certain.

1.6 The 4th century

In the later period, a series of compound terms appear in the written sources, based on *ballista*, and its Greek equivalent, *ballistra*: *carroballista*, *arcuballista*, *manuballista* and *cheiromballista* (e.g., Veg., *Epit. rei mil.* 2.10; 3.3; 4.9-10; 4.18; 4.22; 4.29; 4.44). Exactly what these variants denote is not known: the *carroballista* has been equated, on etymological grounds, with the cart-mounted catapult on Trajan's Column (Marsden 1969, 180; Baatz 1999b, 6; cf. fig. 40); the *manuballista* may have been another name for the *cheiromballista*, probably a hand-held torsion weapon (Campbell 1986, 130); and the *arcuballista* may have been a proto-crossbow (Campbell 1986, 131-132; Baatz 1999b, 14). Of course, the standard arrow-firer was still called a *ballista*.

Fourth-century finds have come to light from several sites, including a bronze washer from Pityus (fig. 38.3); the iron *kambestrion* and washers from Lyon (above, p. 171) could be of similar date. It is not easy to calculate the calibre of the new-style *ballista*, as it does not conform to the Hellenistic construction principles. However, the archaeological finds indicate springs of *ca.* 6-8 cm in diameter and *ca.* 50 cm in height, which compare favourably with those of the Ampurias catapult (above, pp. 164f.). Accordingly, it has been suggested that these iron-framed machines were light weapons, and it is possible that heavy-duty arrow-firers continued to be manufactured with wooden torsion-frames, similar to that of the Hatra *ballista* (cf. Baatz 1999b, 7).

The new-style *ballista* appears to have used a different type of missile, properly designated as a "bolt"; this proposition is based on evidence from Dura-Europos, where an evil-looking projectile, about half as long as the Vitruvian catapult arrow, with a thick, tapering shaft and three large wooden flights, was found (cf. Baatz & Feugère 1981, 208 fig. 13; Baatz 1999b, 11 fig. 9).

There is no sign of the stone-projecting *ballista* in the fourth century. Instead, Ammianus Marcellinus refers only to the one-armed *scorpio* (e.g., 19.2.7; 19.7.6-7;

20.7.10; 24.4.16; 24.4.28; 31.15.12), which the troops called the *onager* (23.4.4, 7; 31.15.12; also apparently designated as *catapulta*: 24.2.13). No archaeological remains have been identified, and Ammianus provides our only description (23.4.4-7), which is sufficiently vague to permit several different interpretations (e.g., Schramm 1918, 70-74; Marsden 1971, 249-265). In short, a single torsion-spring was mounted transversely in a wooden frame, lying on the ground, and a single, wooden arm was inserted into the spring, so that it stood upright. The key component was the sling, located at the arm's extremity, with one end attached and the other end hooked over a pin, projecting from the tip of the arm. The arm was pulled back by a windlass and a stone was loaded into the sling. On release, the arm swung forwards in an arc to meet a padded buffer; in the process, the end of the sling slipped off the pin and fired the stone.

Schramm considered that the buffer should incline to the rear, stopping the arm at 60° from the horizontal (Schramm 1918, 71), while Payne-Gallwey (1958, 283-285; followed by Marsden, 1971, 263) advocated a 90° buffer. More recently, Lewis has suggested that the buffer is best positioned sloping forwards at 135° (Hart & Lewis 1986, 359). Lewis's experiments have also demonstrated that the length of the sling has an important bearing on the range of the machine, and that the angle of the pin with the arm governs the trajectory. Thus, with the pin bent backwards, the stone was released on a steep trajectory and achieved maximum range, whereas, with the pin bent forwards, the stone was released on a flat trajectory (Hart & Lewis 1986, 359 and fig. 8).

Crump claims that the *onager* (or, as Ammianus calls it, the *scorpio*) “was historically employed in some cases to break down the towers and walls of cities” (1975, 103), but immediately points out that Ammianus nowhere mentions such an achievement. This should have alerted Crump to the improbability of his statement, particularly when he later acknowledges that “the pieces [*viz. onagri*] seem to have accomplished more against flimsier targets” (*ibid.*). But he persists in the view that “apparently, the utilization of the scorpion as a battering weapon produced less interesting and less important results, for the historian does not mention its use for that purpose often” (*ibid.*). In fact, in Ammianus's six references to the *scorpio* (the technical digression at 23.4.4-7 makes seven), it is never depicted as a battering weapon. In the defence of Amida, the *scor-*

piones crush the heads of the attacking Persians (19.2.7) and shatter the Persian siege towers (19.7.6-7); at Bezabde, they hurl showers of stones against the Persian battering-rams (20.7.10); at Maiozamalcha, they “hurled round stones wherever they were aimed by expert hands” (24.4.16), and one *scorpio* famously misfired, crushing an *architectus* (24.4.28); and, in the defence of Hadrianopolis, a *scorpio* hurled a huge stone at a group of Goths, failing to hit any of them but intimidating them nonetheless (31.15.12).

It is often thought that the introduction of the *onager* represented a simplification of ancient artillery (e.g., Marsden 1969, 195), but it seems to have been a reasonably efficient machine which could work with a range of missile weights and did not require the fine tuning of two-armed catapults.

2. The effectiveness of ancient artillery

The study of ancient artillery has been dogged by anachronistic comparisons with modern practices, and a fascination with the maximum range which individual machines could achieve. Marsden concentrated on attaining high performance (1969, 86-94). Baatz, on the other hand, has rightly emphasized that, in combat, the gunner’s first priority is to hit the target, and his second is to ensure that the missile has an effect there (cf. Baatz 1980a, ix; 1994b, 138). There is no place in battle for experimentation with maximum ranges.

As a general rule, the shorter the range, the more certain the hit, not only because of difficulties in sighting far-off objects, nor even in tracking moving targets, but also because of the missile’s sensitivity to the effects of wind and weather. Agesistratos is supposed to have attained ranges of 3½ stades (650 m) with a specially tuned three-span machine, and 4 stades (740 m) with a four-cubit palintone (Athen. W 8), but Baatz has pointed out that, to cover these distances, the respective missiles will have been airborne for around 12 seconds, during which time they could have been carried adrift by several metres (1980, x; 1994b, 140). It is doubtful whether, in battle, arrow-firers would have been used much beyond 100 metres of their intended target (cf. Baatz 1994b, 140).

One passage is continually quoted as evidence of the pin-point accuracy of ancient artillery. Caesar relates the story of how, during his siege of Avaricum, a succession of Gauls, stepping up to the same gate, were each pierced by a *scorpio* missile (Caes., *Bell. Gall.* 7.25). In Marsden's view, this was "an excellent piece of sharp-shooting" (1969, 93), and Schneider even believed that the *scorpio* in question must have been similar to Philon's prototype "repeating catapult" (*Bel.* 51 = Th. 73), in order to hit the same spot time and again (1910, 1321; followed by Lammert 1927, 585). But, as Drachmann correctly pointed out, "we do not know whether one or ten catapults were aimed at the gate; we do not know whether it took one or ten arrows to kill each Gaul" (1960, 205); and, he could have added, we do not know at what range the artillery was operating. Of course, the sources abound with stories of the fortunate, who narrowly avoided catapult missiles, and of the less fortunate, such as the Gauls at Avaricum; these certainly "afford some idea of what artillery could do against personnel" (Marsden 1969, 96), but we cannot tell whether they were typical, or extraordinary, occurrences.

Modern commentators have often credited stone-projectors with the potential to demolish fortifications (cf. above, p. 174). This is largely based on the allegation of Diodorus Siculus that, at Tyre in 332 B.C., Alexander "shook the walls" with large stones fired from stone-projectors (17.42.7; 17.45.2). Demetrius is said to have done the same at Rhodes in 305/304 B.C. (Diod. Sic. 20.88.2), even managing to demolish a newly-constructed harbour wall which was "low and weak" (Diod. Sic. 20.86.2). But it was only battlements that Demetrius smashed at Salamis (Diod. Sic. 20.48.4) and that Vespasian's heavy stone-projectors demolished at Jotapata (Jos., *Bell. Jud.* 3.243), and it is worth noting that Demetrius's and Vespasian's stone-projectors were massive "one-talent" machines (Diod. Sic. 20.87.1; Jos., *Bell. Jud.* 3.167).

When dealing with defence against a besieger, Philon shows concern with the effect of stone-shot hitting a wall directly, and recommends that town walls be 10 cubits (4.6 m) thick to withstand such blows (*Pol.* 1.19 = Th. 81). Marsden has made much of this (1969, 97: "blows [of stone throwers] were not to be despised"; 113: "stone throwers undoubtedly provided a certain amount of purely destructive fire which could, on its own, beat down walls, especially weak ones"), although he admitted that "their effect on

properly constructed walls is highly questionable” (*ibid.*, 146). It should be noted that nowhere do our sources mention artillery creating a breach, and there is a considerable gulf between shaking a wall, and causing structural damage. When Titus threatened the defenders of Gischala in A.D. 67, saying that “soon they would know that their wall was a plaything for the Roman machinery” (Jos., *Bell. Jud.* 4.96), it was surely the battering-rams he meant, and not artillery.

Another misconception involves the supposed trajectory of artillery balls. Schramm followed accepted wisdom in classifying stone-projectors as “Steilfeuergeschützen”, or “steep-trajectory guns”, while only arrow-firers were “Flachbahngeschützen”, that is, artillery that fires straight ahead (Schramm 1918, 14 n. 1). This myth persists, despite Baatz’s observation that “there is no ancient authority from which to conclude that stone-projectors were ‘high-trajectory artillery’” (1980a, x; 1994b, 143). Furthermore, such indirect targeting presupposes the ability to accurately gauge, and rapidly alter, the range. And finally, high trajectory shooting is of limited value in an era without explosives. In summary, it is unreasonable to expect the crew of a stone-projector to achieve a direct hit on an unseen, distant target, and such a shot would be of questionable military value.

Nevertheless, Schramm specified that, “depending upon the desired range, the inclination of the ladder [i.e., the “stock” of the stone-projector] was usually set at either 30° or 45°” (1928, 233), an opinion endorsed by Marsden (1969, 92: “the normal angle of projection tended to exceed 30 degrees”); reconstructions of the machines habitually show them set at an angle of around 45° (e.g., Marsden 1969, fig. 1.22; 1971, diagram 11; Connolly 1981, 282; 1983, 81). Schramm evidently envisaged the machine operating with the end resting at ground-level (cf. Schramm 1928, 233), so his two angles of elevation must relate to alterations in the height of the machine’s base.

Neither Heron nor Philon describe the base of a stone-projector. The base which Heron describes is for an arrow-firer (*Bel.* 13-14 = W 88-90), and is rightly adopted for modern reconstructions of that machine. Philon’s sole description of a base accompanies his *polybolos* or “repeating catapult” (*Bel.* 52 = Th. 74). Only Vitruvius gives a description

(albeit an abbreviated one) of a base specifically designed for the *ballista*; frustratingly, he states that the height bears no relation to the *foramen* (the module for all other components), but should be whatever is necessary in practice. This was no doubt to ensure that the more massive machines were still low enough for loading purposes. Interestingly, all three versions incorporate a horizontal element lying along the ground, so that the machine could not be positioned on an uneven surface. Unfortunately, Vitruvius does not explain how the *ballista* was attached to the base (*De arch.* 10.11.9). Marsden regretted the absence of a “universal joint”, the tilt-and-swivel mechanism that Heron describes in connection with the arrow-firer (1971, 204-205 n. 38); but, predictably, he saw a problem only with traversing the gun, envisaging the insertion of blocks of wood under the rear end to alter “the elevation (i.e. range)” (*ibid.*).

This begs two questions. First, that the larger versions of such a complex machine did not have a dedicated system of raising and lowering the end, perhaps by the use of pulleys. And second, that the proper functioning of a stone-projector involved firing at different ranges, and hence along different trajectories. In fact, it would make better sense for the machine to be set at 30-45° for tensioning and loading, and then raised to a horizontal position for firing. There was surely no question of selecting a particular range. Enemy objects would either be too far away, or would form a viable target for arrow-firers and stone-projectors alike. Baatz has emphasized the desirability of short range to ensure accurate targeting, and flat trajectory to maximise forward thrust and the resultant damage (1994b, 142).

In fact, there is good reason to think that the maximum operational range for the giant one-talent stone-projectors was around 150 metres, rather than the theoretical 400 yards (365 m) suggested by Marsden (1969, 91). In his ideal defensive scheme, Philon (*Pol.* 1.69-73 = Th. 84-85) specifies a succession of three ditches, covering a total distance of 535 feet (165 m), in order to keep these machines out of range. Armed with this knowledge, Marsden still maintained that “stone-throwing catapults could operate normally up to 400 yards” (*ibid.*), whereas the logical conclusion is that potential targets were safe, provided they remained at least 165 metres away from the largest catapults (cf. Baatz 1994b, 141).

3. The positioning of ancient artillery

It is often forgotten that artillery-pieces required room to operate. Greek scholars have been quick to appreciate this, Roman scholars less so (with the honourable exception of Baatz; e.g. 1966, 199). In his study of Greek fortifications, Ober has tabulated the minimum tower-chamber sizes required to accommodate machines of particular calibres. For a two-cubit arrow-firer (cf. above, p. 159), admittedly on the large size but by no means the largest, he allocates a space 3.10 m long (which includes around 0.5 m working room at the rear; totalling the case and the windlass gives an overall machine length of 23 spring-diameters, or approximately 2½ metres) and a width, from one arm-tip to the other, of 1.40 m (Ober 1987, 600). Winter (1997, 250) is more generous with his zone of free space, prescribing an area of 3.52 m by 2.40 m.

Ober's table of stone-projectors shows that a ten-mina machine (above, p. 160), a relatively light-calibre weapon, required a working area of 6.40 metres by 2.50 metres (Ober 1987, 601). Winter recommends more free space at the sides, suggesting an area of 6.36 m by 3.18 m (1997, 249). These dimensions assume that the machines were more or less static, firing through a designated tower window, and thus swivelling through a fairly limited arc.

Excavators have always been keen to find evidence of artillery along Roman circumvallations, largely following Schulten's work at Numantia (see above, p. 104). Although the tower which he discovered on the Dehesilla-Alto Real sector, at only 2.20 m × 2.10 m, was too small for artillery, he suggested that those on the Dehesilla-Molino sector, measuring approximately 5.0 × 4.0 m, could have accommodated two catapults at wall-walk level, leaving the putative upper storey for signalling. Schulten seized upon Apian's statement, that towers were built every 30 metres, to postulate three hundred towers around the entire circuit. Although he had discovered only a fraction of that number, which, in any case, did not conform to a uniform 30 m spacing, nevertheless he proposed a theoretical complement ("Geschützpark") of six hundred artillery-pieces, which he then arbitrarily halved (1927, 44, mistakenly citing Jos., *Bell. Jud.* 5.359, as evidence of 300 Roman catapults at Jerusalem, but these 300 *oxybeleis* are in Jewish hands).

Appian records that Scipio positioned “arrow-shooting and stone-projecting catapults” (*katapeltai oxybeleis kai lithoboloi*) on the towers, and gathered “stones and missiles and javelins” (*lithoi kai belē kai akontia*) on the battlements (App., *Hisp.* 92). Schulten reasonably proposed small-calibre stone-projectors (1927, 44), although the example which he cites as a parallel case — the 100-cubit (46 m) timber tower, built by the defenders of Halicarnassus and equipped with arrow-firers to counter Alexander the Great (Diod. Sic. 17.26.6) — is irrelevant to a discussion of stone-projectors.

It seems that Schulten envisaged a calibre of one or two minas (i.e., 440 g and 880 g) for his tower-mounted “light” stone-projectors (Schulten 1927, 45 and 264-265), judging from his designation of the ten-mina *lithobolos* as “heavy artillery” (*ibid.*, 44: “schwere Geschütze”; this calibre is usually considered fairly light). Certainly, five small stone balls were found in the three camps of Castillejo, Peña Redonda, and Valdevorron, and a further eight within Numantia itself (see Table 19, p. 185), which Schulten took to have been shot there by the Romans (*ibid.*, 264-265), and Vitruvius indicates that there were small stone-projectors designed for these calibres (above, pp. 166f.). Nevertheless, caution is advisable when dealing with stones that could comfortably be hurled by hand (cf. Baatz 1983, 136; Griffiths 1992, 2-6).

If, as Appian says, stone-projectors were deployed in the towers, it seems rather more likely that a 4 m × 5 m tower would have been equipped with a single small stone-projector, perhaps the rarely-mentioned five-mina (2.2 kg) machine, for which Marsden gives a case-length of 3.20 m (1969, 151: “10 feet 6 inches”). Unfortunately, this calibre does not figure among the few *ballista*-balls from Numantia, but the ten-mina machine would simply have been too large (see above, p. 179).

Numantia notwithstanding, the most obvious role for the towers at Masada (above, p. 118; fig. 26) was signalling and observation, as Schulten appreciated. His experience of Numantia led him casually to suggest that artillery may have been involved (1933, 93), but it was Hawkes who pointed up the parallel most enthusiastically (1929, 202: “the towers ... [had] a solid stone lower storey ... which could serve as a platform for artillery”). Reviewing Schulten’s work, Hawkes and Richmond claimed that the towers’

spacing suggested artillery (1934, 72), but Richmond later managed to combine all previous theories, stating that “their purpose is presumably to accommodate bowmen or light artillery and signals and to give height for look-out” (1962, 153). However, he is mistaken to cite Josephus for corroboration of artillery along the investing works at Jerusalem (*ibid.*, 153 n. 61, citing Jos., *Bell. Jud.* 6.21, which actually mentions artillery in defence of embankments), and it must be said that the most obvious function for a chain of towers in this location was for surveillance.

At Machaerus (fig. 25), Strobel interpreted a series of approximately 2 m-deep platforms as the foundations for artillery towers, claiming a spurious parallel with Masada (above, p. 113). However, he himself acknowledged that a light arrow-shooter was around 2.5 m long, and would thus require clearance of 3×3.5 m (1974b, 150 n. 75). (In fact, even a three-span like the Ampurias machine, at about 1.78 m long, would be a tight fit.) The two platforms of stones in Camp E are larger, and thus better suited to Strobel’s interpretation as catapult stations (1974b, 153; cf. p. 113, above), while their location could conceivably be linked to controlling the exit from the wadi. Unfortunately, Strobel does not indicate the weight of the 40 cm stone ball recovered from the site (above, p. 114); two similarly-sized balls from Pergamum weighed three talents (*ca.* 75 kg), but no other assemblage can offer anything comparable (Table 19, p. 185), which inevitably casts doubt on its interpretation as a *ballista* ball.

At Cremna (fig. 29), the excavator suggested that two turrets on the eastern barrier wall, facing the town at a distance of 130 m, “seem to have contained a solid central platform ... and were surely designed as platforms for onagers” (Mitchell 1995, 196). He does not state which turrets he had in mind, but earlier specifies Turret 4, alone, as a position where *onagri* would have been placed (*ibid.*, 195). Such weapons are unlikely at this early date (*pace* Mitchell 1995, 183), and the dimensions of Turret 4 are, in any case, unclear, which precludes any assessment of artillery accommodation. (Mitchell states that it “may have enclosed a tower 4-5 m square”, *ibid.*, 202.) The position of Turret 4 is interesting, as artillery deployed here would have been well-placed to assist those working on the embankment with covering-fire. A similar role was suggested for the

hummock at Masada (Richmond 1962, 154); artillery situated here, behind and to the right of the embankment, would be ideally located to protect the workers (cf. fig. 53).

Curiously, the turrets at Alesia never figure in this argument (above, p. 108). Marsden never mentions the site, and Harmand was reluctant to commit himself (1967b, 152), but Fuller assumed that artillery was deployed, not only in the turrets, but along the rampart as well (1965, 155); the latest reconstruction of the site depicts artillery only on the former (Bénard 1996, 56). In fact, Caesar never explicitly indicates the purpose of the turrets, and mentions catapults only on the occasion of the Gallic night attack, when *complura tormentis tela coniciuntur* (*Bell. Gall.* 7.81). But turrets designed with catapults in mind would surely have been larger than 3 × 3 m (above, p. 106), a floor-space suitable for only a single lightweight arrow-firer.

Most recently, Davies has flatly contradicted this evidence with his general rule that circumvallations were equipped with artillery: “Generally, a timber turret or tower emplaced directly on top of the rampart line would have provided adequate support for light, anti-personnel engines for defensive fire, and the provision of a reinforced platform (usually immediately behind the line), might suggest more aggressive intent, with the use of heavier machines capable of clearing the enemy parapets or even of inflicting direct structural damage” (2001, 202). Unfortunately, this theory flies in the face of everything we know about artillery and about circumvallation turrets.

Where artillery was deemed necessary for town or camp defence, it seems usual to have sited it on ramparts or towers, provided these were deep enough. But in the Numantia camps, Schulten interpreted a selection of buildings, united only in their fragmentary condition and the presence of the odd *ballista* ball in their vicinity, as artillery positions (“Geschützstände”). Behind the west rampart of Peña Redonda, Schulten restored a 3 × 5 m floor-space to accommodate a 10-mina stone-projector, and a neighbouring 1.4 × 5.0 m floor-space to accommodate a 2-mina stone-projector (1927, 102-103). Against the north rampart of Castillejo, he identified a group of four robustly-built, double-roomed structures, each approximately 5.9 × 5.9 m with a large door on the south wall, as double batteries for 10-mina stone-projectors (*ibid.*, 211). And at Valdevorron, four

long, narrow buildings, divided lengthwise into two rooms, each approximately 3 m wide, were assigned to 10-mina stone-projectors (*ibid.*, 218-219).

It should be noted that a room 5 metres long, as at Peña Redonda, would not have accommodated a ten-mina machine (above, p. 179); nor would a room 1.4 metres wide have accommodated a two-mina machine. Schulten's dimensions for the latter, apparently supplied by Schramm, are too small at 2.5×1.30 m (1927, 44 n. 3); Marsden's rule of thumb, whereby a stone-projector's length totalled 30 *diametroï* (Marsden 1969, 34), gives 3.73 metres ($30 \times 6\frac{1}{2} = 193$ dactyls), and twice the arm-length as a rough guide to width gives 1.5 metres ($2 \times 6 \times 6\frac{1}{2} = 78$ dactyls).

Later, Schulten subtly altered his theory of artillery-positions, specifying that they were "massive artillery-platforms, in which the interior was filled with earth" (1929, 55). In this regard, Ammianus Marcellinus's reference to the late-Roman, one-armed *onager*, sitting on a bed of "turf or bricks" (Amm. Marc. 23.4.5), has cast a long shadow over artillery research. Already in 1899, it was cited as an explanation of turf expansions on the Antonine Wall (Glasgow Archaeological Society 1899, 146-147), but Ammianus's story has been consistently misunderstood. First, it applies only to one particular artillery-piece, the *onager* (above, pp. 173ff.), which had an entirely different design from the usual torsion catapults; in particular, where two-armed machines transfer virtually all of the torsion energy to the projectile, making any recoil negligible, the single arm of the *onager* was designed to crash against a buffer, creating a *concussio violenta* which must have shifted the machine forwards and downwards (Campbell 1984, 79-80). Secondly, it seems only to have applied to large *onagri*, as there is no mention of special arrangements being made for the machines which Ammianus and his colleagues redeployed during the defence of Amida (19.7.6-7).

Similarly, Ammianus's *congesti caespites* have probably influenced the almost universal acceptance of the south camp gate traverses at Burnswark (the "Three Brethren") as "ballista platforms" (above, p. 93). However, when he proposed the idea, Collingwood appended the proviso that, "before regarding this identification as certain, parallel cases ought to be cited; and the writer regrets that he is at present unable to do this" (1925/26,

56 note). Jobey's observation that "the unusual rounded *tituli* ... could have served as platforms for spring-guns" (Jobey 1977/78, 57), betrays an ignorance of catapult bases, which above all required a level and firm surface to ensure the weapon's effective operation (above, p. 178). The *titula* may well be "admirably located to allow artillery to play upon the ramparts and gateways of the hill-fort" (*ibid.*, 91), but no thought has been given as to how the machines were positioned there.

Certainly, the site yielded unequivocal evidence of stone-projectors, in the form of fourteen sandstone balls, and fragments from a further nine. The three most recently found examples were "comparatively small", two weighing 0.60 kg, the other 0.50 kg (no dimensions were recorded: Jobey 1977/78, 90). The nine earlier finds were said to represent four sizes: 1.10 kg, 0.70 kg, 340 g, and 170 g. Jobey commented that "it may be doubted if the lighter specimens were ever intended for spring-guns" (*ibid.*), and he is probably correct as regards the 170 g ball. Catapults are not unexpected in the context of a siege (cf. Table 20, pp. 205f.), but their positioning on the "Three Brethren" remains very much to be proven.

Collingwood was perhaps subconsciously influenced by the three *belostaseis lithobolois*, "positions for stone-projectors" (Polyb. 9.41.8), which Philip V set up in front of Echinus in 210 B.C. It is generally assumed that these were some form of platform (e.g., Marsden 1969, 53, 110; Garlan 1974, 350-351 n. 21a), although it is unlikely that resiliency was a primary concern (Campbell 1989). Rather, it was more important to ensure the stability of the weapon on a firm surface (cf. Lawrence 1979, 78 *ad* Philon 1.32 = Th. 82: "these emplacements ... were open-air platforms or pavements"), and perhaps add a roof to provide protection against the elements and enemy fire (Campbell 1984, 82; cf. Carter 1989, though the shed which he envisages appears to be for storage). Above all, the nature of the catapult base appears to have required a flat surface (above, p. 178), such as can clearly be seen on Trajan's Column (fig. 41) where the artillery-piece is sited on a wooden platform.

In conclusion, it must be admitted that the heavily-restored structures which Schulten interpreted as "massive artillery-platforms" (above, p. 182) are very dubious; if they

were, in fact, buildings, their function surely lies elsewhere. Similarly, it is difficult to see how the “Three Brethren” could have accommodated *ballistae*, without some sort of timber framework; but such a structure would have had no need of the massive *titula*. The testimony of Appian leads us to believe that Scipio had tower-mounted artillery at Numantia, although the archaeologically attested accommodation is cramped. The same situation obtains at Alesia, and is even worse at Machaerus and Masada, where, in any case, the towers were probably only for observation.

Weight (minas)	Salamis (late 4th C BC)	Pergamum (3rd C BC)	Rhodes (3rd C BC)	Tel Dor (3rd/2nd C BC)	Carthage (2nd C BC)	Numantia (2nd C BC)	Cáceres (1st C BC)	Masada (1st C AD)	Weight (librae)	Weight (kg)
1.0						6 (30.0%)			1.3	0.4
1.5								6 (12.0%)	2.0	0.7
2.0						7 (35.0%)		12 (24.0%)	3.0	0.9
3.0				6 (2.8%)		3 (15.0%)		12 (24.0%)	4.0	1.3
5.0		1 (0.1%)	1 (0.3%)	18 (8.3%)	900 (18%)			12 (24.0%)	6.7	2.2
8.0				11 (5.1%)				3 (6.0%)	10.7	3.5
10.0	2 (6.7%)		46 (13.3%)	30 (13.8%)	3500 (71%)	3 (15.0%)		1 (2.0%)	13.3	4.4
12.0		1 (0.1%)		15 (6.9%)		1 (5.0%)		1 (2.0%)	16.0	5.2
15.0	1 (3.3%)	1 (0.1%)	56 (16.2%)	23 (10.6%)					20.0	6.5
18.0		20 (2.1%)		9 (4.1%)	550 (11%)				24.0	7.9
20.0	11 (36.7%)	67 (6.9%)	36 (10.4%)	9 (4.1%)					26.7	8.7
22.0				10 (4.6%)					30.0	9.6
25.0			85 (24.6%)	19 (8.8%)					33.3	10.9
30.0	6 (20.0%)	118 (12.2%)	83 (24.0%)	23 (10.6%)			3 (20.0%)	2 (4.0%)	40.0	13.1
35.0							1 (6.7%)		46.7	15.3
37.5		166 (17.2%)					2 (13.3%)		50.0	16.4
40.0	7 (23.3%)	126 (13.0%)	7 (2.0%)	28 (12.9%)					55.0	17.5
50.0			7 (2.0%)	12 (5.5%)			5 (33.3%)	1 (2.0%)	65.0	21.8
60.0	1 (3.3%)	353 (36.5%)	7 (2.0%)	4 (1.8%)			2 (13.3%)		80.0	26.2
65.0		16 (1.7%)							85.0	28.4
70.0	1 (3.3%)		5 (1.4%)				1 (6.7%)		93.3	30.6
80.0	1 (3.3%)		7 (2.0%)						106.7	34.9
90.0		57 (5.9%)	2 (0.6%)				1 (6.7%)		120.0	39.3
100.0		6 (0.6%)	4 (1.2%)						133.3	43.7
120.0		33 (3.4%)							160.0	52.4
180.0		2 (0.2%)							240.0	78.6

Table 19: Archaeological finds of stone-projector missiles

Sources:

Salamis: E.W. Marsden, in: V. Karageorghis, *Excavations in the Necropolis of Salamis 3*, 1973, 222-228.

Pergamum: A. von Szalay & F. Böhringer, in: *Altortümer von Pergamon* 10, 1937, 48-54.

Rhodes: L. Laurenzi, in: *Memorie dell'Istituto Storico-Archeologico di Rodi* 2, 1938, 33-36.

Tel Dor: Shatzman 1995, 61.

Carthage: B. Rathgen, in: *Zeitschrift für historische Waffenkunde* 5, 1909/11, 236-243.

Numantia: Schulten 1927, 264-265.

Cáceres: G. Ubert, *Cáceres el Viejo. Ein spät-republikanisches Legionslager*, 1984, 112.

Masada: Holley 1994, 364.

Chapter 6:

Ladders, shelters, rams and towers

Plutarch tells the story of how, during the Roman siege of Syracuse in 211 B.C., “the Romans became so fearful that, if they saw so much as a length of rope or a piece of timber appear over the top of the wall, it was enough to make them cry out, ‘Look, Archimedes is aiming one of his machines at us’, and turn their backs and run” (Plut., *Marcellus* 17.3).

For the ancients, the term *machina* (in Greek, *mēchanē*) came to be applied to any instrument or device. Its implications of ingenuity meant that it could equally be applied to a stratagem or ruse, so that the remark of the Roman soldiers quoted by Plutarch neatly incorporates a *double entendre*.

1. Scaling Ladders

There were many unorthodox and *ad hoc* methods of scaling town walls. In one of several assaults on Carthage in 146 B.C., Laelius’s troops used “timbers, machinery and planking”, perhaps arranged in some form of scaffolding, to capture the wall of the Cothon district (Appian, *Pun.* 127). The troops of Popillius Laenas, assaulting Heraclaeum in 169 B.C., made a novel use of the *testudo* shield-formation, by climbing on top of it, and thence onto the town wall (Livy 44.9.6-9), and Brutus’s forces resorted to leaning tree-trunks against the walls of Xanthus in 42 B.C. (Appian, *Bell. Civ.* 4.78). Far less ingenious but just as effective was the stratagem of the centurion, Fabius, who

wished to be first over the wall at Gergovia in 52 B.C., and accordingly had three comrades lift him up there (Caesar, *Bell. Gall.* 7.47).

However, for a properly coordinated escalade in force, ladders were required. It was obviously more convenient to construct such a simple device on the spot, as and when the requirement arose; for example, at Carthage in 149 B.C., Censorinus sent troops out to cut wood to make “machines and ladders” (Appian, *Pun.* 97). It was obviously of crucial importance that the ladders be long enough to achieve their objective. Vegetius offers two pieces of advice, the second rather more practical than the first:

“The measurement is acquired in two ways; for either a thin and light thread is tied at one end to an arrow, and, having been directed at the highest point of the wall, when it arrives, the height of the wall is inferred from the length of the thread; or else, when the slanting sun casts a shadow of the towers and walls on the ground, then, without the enemy knowing, the length of this shadow is measured, and likewise a ten-foot rod is fixed up and its shadow likewise measured. Drawing these together, nobody doubts that the height of the town is found out from the shadow of the ten-foot rod, when it is known what height casts what length of shadow.” (Veg., *de re mil.* 4.30)

Of course, Vegetius’s method only estimates the height of the town wall. Polybius gives rather more detailed instructions, incorporating a method for gauging the appropriate length of the required ladders:

“The method of calculating the proportions for ladders is as follows. If the height of the wall has been supplied by one of our collaborators, the ladder’s proportions are self-evident; for, if the height of the wall is ten of a given unit, the ladder must be fully twelve. The offset of the ladder, so as to suit those climbing it, must be half the length of the ladder, in case either by standing further off it shatters with the number of those mounting, or conversely by propping up straight it is too insecure for the climbers. If it is impossible either to measure or to approach the wall, the height of any object standing upright on the ground can be taken from a

distance. The method of determining it is both possible and easy for those who become involved in mathematics.” (Polyb. 9.19.5-9)

Plutarch presents Marcellus as calculating, from personal observation, the required ladder length at Syracuse (Plut., *Marc.* 18.3). No doubt, he employed a similar technique to the besieged Plataeans in 428 B.C., who judged the height of the Spartan siege wall which encircled them (Thuc. 3.20.3-4) by the simple arithmetic of counting the courses of bricks, then estimating the size of an individual brick. Thucydides emphasizes that many observers were involved, to safeguard against one man calculating incorrectly.

Something of the sort may have happened during Scipio Africanus’s initial assault on Cartagena in 210 B.C., when, according to Livy (26.45.2), few of the ladders were long enough to reach the top. Ladder-length was not the problem for Count Immo, sent by Julian in A.D. 361 to recapture Aquileia from its mutinous garrison: “many carried ladders adjusted to the height of the walls, but when they were almost touching the wall, some (men) were dashed down by rolled stones, others were transfixed by whistling missiles” (Amm. Marc. 21.12.6). This tactic is illustrated on Trajan’s Column (scene CXIII, cast 302; fig. 42, top-left), where a Dacian defender looms over a Roman ladder, brandishing a boulder above his head. However, rather than beating back the assailants, it was perhaps more effective to get rid of the ladders altogether. In Philon’s recommendations for standing siege, he writes: “hooked sticks and clawed cleavers are useful for warding off and throwing down erected ladders” (*Pol.* 1.79 = Th. 85). His later advice, that “their screens (*dokides*) and the ladders which they set up can easily be shattered and thrown back from the wall if they are hit sideways by stone-projectors” (*Pol.* 3.39 = Th. 94), surely springs from his preoccupation with artillery; the passage continues, “or (the screens and ladders can easily be) burned by sprinkling naphtha, if you have some, and throwing torches from above”.

Assaulting a town by escalade was clearly a dangerous proposition. In his description of a Roman attempt to scale the north portico of the Jerusalem Temple in A.D. 70, Josephus (*Bell. Jud.* 6.223-225) gives a flavour of the hazards involved:

“The Jews did not move quickly to prevent [the escalade], but violently met the climbers, throwing down those whom they pushed backwards, and destroying those whom they encountered; many, stepping off the ladder, they struck with their swords, before they could protect themselves with their shields, and they threw down some ladders, full of soldiers, from above, by tilting them sideways; but not a few of them were themselves killed. Those who brought up the standards fought around them, believing their capture to be a terrible dishonour.”

The soldier depicted in the process of escalade on Trajan's Column (scene CXIII; fig. 42, left of centre) has apparently beheaded a Dacian defender. Ideally, the officer in charge of an escalade would have attempted to disperse the opposition, immediately prior to his soldiers ascending. Often, a feint at a different sector was intended to draw the defenders away. At Cartagena, it was the main, unsuccessful escalade which provided the diversion for Scipio Africanus's successful assault across the lagoon (Livy 26.46.2). A similar strategy lay behind Scipio Aemilianus's nocturnal assault, soon after his arrival at Carthage in 147 B.C.; he sent men armed with axes, crowbars and ladders against two separate sectors, hoping to surprise the defenders, but the move was spotted and the alarm raised (Appian, *Pun.* 117). At Elataea and Phocaea, the escalades were apparently planned to draw defenders away from breaches in the walls, while the reverse tactic, as recommended by Onasander (*Strat.* 42.5), was applied at Haliartus.

As an alternative, an escalade might be mounted at an unguarded sector of the town circuit. At Carthage again, the fleet commander, Mancinus, targeted a length of curtain left unpatrolled because it ran along a sheer cliff-edge, accessible only by sea. When a few men had scaled the wall, a Carthaginian force sallied out of a nearby postern; the rest of Mancinus's task-force routed them and entered the gate at their heels, but were immediately trapped and outnumbered within the city, and had to be extricated by Scipio on the following day (Appian, *Pun.* 113-114).

The fear of escalade often drove an unprepared town to surrender, as at Locha in 204 B.C., which hints at the dreadful ferocity of a legionary assault. A particularly high

proportion of escalades occurred during the Macedonian Wars (above, pp. 32f.), a fact that may have a bearing on the number of surrenders from the same period.

2. Shelters

A variety of shelters are mentioned in the literary sources; in Appendix 1, I have differentiated between *vineae* (which I render as “shelters”), *plutei*, “screens”, *porticūs*, “galleries”, and *testudines*, “sheds” (see Table 20, pp. 205f.). The bewildering array of translations which have been employed for these terms in the past does not help in our understanding of the individual devices. For example, Lewis and Short translate the term *vinea* as “a kind of penthouse, shed, or mantlet” (1879, *s.v. vinea*), and *pluteus*, similarly, as “a penthouse, shed, or mantlet” (1879, *s.v. pluteus*). The defining feature of a penthouse is, of course, the sloping roof (cf. *O.E.D.*, *s.v.*), a reasonable assumption in a shelter designed to deflect missiles, but “mantlet” probably means very little to modern readers. Fortunately, there are several technical descriptions of the different shelters which can be drawn upon.

2.1 The Vineae

By far the most commonly mentioned shelter, the *vinea* is often associated with the construction of embankments, as at Heraclea, Suthul, Thala, Noviodunum, the town of the Atuatuci, the town of the Sotiates, Avaricum, Uxellodunum, Pindenissus, Massilia, Ategua, Placentia, Bezabde, and Maiozamalcha. So much so, that their presence at other sieges perhaps hints at an intention to undertake construction work, as at Casilinum, Nesactium, and the fort on the Muluccha River, while their presence at Leucas and Ambracia will have been connected with undermining work. Only Caesar, the great improviser, is known to have utilised *vineae* as temporary defences, at Alexandria in 48 B.C.

Both Apollodorus, writing under Trajan, and Vegetius, probably drawing upon a Flavian source (above, p. 157), describe a device which they call “vines”, on account of a supposed similarity to vineyard trellises. Apollodorus’s *ampeloi* (W 141-143) are constructed from sets of five poles, stuck into the ground with iron spikes, and joined together with cross-pieces; the whole thing is draped loosely with two layers of hides,

which absorb the impact of arrows and sling-stones, and, by using two different lengths of pole, the shape of a *chelōnē*, or “tortoise”, is created. Some poles are man-height, others one-and-a-half times man-height, and the structure appears to have taken the form of a large ridge-tent. There are obvious ambiguities in the description. Lendle favoured a square structure, five poles by five, in which the central row is tallest, the second and fourth rows less so, and the outer rows shortest (1983, 139 fig. 39), but Neumann took the figure five to be the distance in feet (1.48 m) between individual poles (1961, 107).

Vegetius’s *vinea* (*Epit. rei mil.* 4.15) is slightly different. He envisages a structure of light timbers, with wickerwork sides and a boarded roof, the whole thing covered with raw hides as a protection against fire. Its dimensions are quoted as eight feet (2.4 m) wide, seven feet (2.1 m) high, and sixteen feet (4.7 m) long, but individual structures are joined to form corridors. Neumann was at pains to reconcile the two descriptions (1961, 107-108), pointing out that both had doubled roofs (although Apollodorus mentions only a double layer of raw hide), and that Vegetius’s seven-foot height could well be a reference to Apollodorus’s man-sized poles (though it is surely more likely that the seven-foot height refers to the man-and-a-half height poles, stuck into the ground).

Vegetius does not mention a gabled roof (*pace* Connolly 1981, 297; cf. Liebenam 1909, 2243; Lendle 1983, 140, envisaging a flat roof), although such would certainly be advisable in repelling stones and missiles. Indeed, if we assume that Vegetius intended this design, once his *vinea* was clad in raw-hide, it could well have resembled Apollodorus’s *ampelos*.

Rice Holmes wrestled with the question of how *vineae* were used in constructing an embankment (Holmes 1914, 96). He realised that the shelters described by Vegetius, if placed end to end, would have enabled men to bring up materials in the same way as the *porticūs* at Massilia (Caes., *Bell. Civ.* 2.2). However, “whether *vineae* were used by the men who actually reared the fabric, we are not told ... inside *vineae* they could not have worked”, and he proposed that “they were screened by the defences called *plutei*” (*ibid.*).

2.2 Aperti Cuniculi

It is appropriate to comment here upon the *aperti cuniculi* which were prevented from approaching the walls of Avaricum by means of sharp stakes, molten pitch and large boulders (Caes., *Bell. Gall.* 7.22). These enigmatic “open tunnels” have inspired an elaborate theory of passageways within embankments (above, p. 149), but Holmes interpreted them as “the galleries by which [the Romans] were approaching to undermine the walls” (1911, 144), while Mesnil du Buisson (1939, 66) believed them to be mines which the Gauls had burst open (cf. Liebenam 1909, 2252). The sensible suggestion (Hough 1940), that they were simply the lines of shelters under which those engaged on the construction of the embankment moved from the rear to its front face, was rejected by Heubner, obstinately insisting that a *cuniculus* must be underground (1959, 508). Wimmel’s attempt to combine both theories succeeded only in producing the unlikely scenario of successive layers of shelters, each buried in turn by the increasing mass of the embankment (1974, 20-30; cf. the lukewarm reception of Harmand 1974, 386; 1976). The most likely explanation is that Caesar saw the lines of *vineae*, snaking along the embankment, as open-air tunnels.

2.3 The Pluteus

According to Vegetius (*Epit. rei mil.* 4.15), the *pluteus* was a convex wicker shield with an arched roof, which ran on three rollers. Although Vegetius envisaged these specifically as shelters for missile-troops supporting an escalade, Caesar describes their use in various situations: as frontal protection for workers (*Bell. Civ.* 2.15; possibly 2.9); as wicker breastworks (*Bell. Gall.* 7.41.4; 72.4; cf. *Bell. Civ.* 1.25; 3.24, on shipboard); and as panels on turrets (*Bell. Gall.* 7.25). In fact, the word is used of the wicker cladding on other military structures (e.g., Vitr., *De arch.* 10.15.1, 5), and is found in civilian contexts denoting screens of various kinds (Lambertz 1951, 982-986).

Again, there is the problem of Greek terminology. The shelters which Vespasian set his men to construct, in preparation for the siege of Jotapata, may have been *plutei*; they are described as follows:

“some, stretching wicker (*gerra*) over palings as a shelter from missiles thrown from above, heaped up (the earthworks) from under them” (Jos., *Bell. Iud.* 3.163)

Titus adopted the same arrangement of wickerwork shelters to protect the workers at Jerusalem (Jos., *Bell. Iud.* 5.269). Although Liddell and Scott took *gerra*, “wicker-work”, to be cognate with the Latin *vinea* (Liddell *et al.* 1940, s.v. γέπρον), Walbank believed Polybian usage of the word, in the context of the Roman siege of Syracuse, to indicate “wicker-work screens” (1967, 71); in other words, *plutei*.

In siegecraft, *plutei* are occasionally found in conjunction with *vineae*, as at the town of the Ausetani, Massilia, and Placentia; in these cases, one can easily envisage their forming the frontal protection for a line of *vineae*, as Holmes prescribed (above, p. 191). Liebenam believed that *plutei* would have run around the perimeter of an embankment under construction (1909, 2243), but the threat to the workers came primarily from the front.

Of course, a general screening function could easily have been fulfilled by the ubiquitous *crates*, those miscellaneous wicker panels which are often found in conjunction with *plutei* (e.g., Caes., *Bell. Civ.* 2.9, 15). However, the role of *plutei* in combat, guaranteeing protection at Syracuse (above) and Aquileia, emphasizes the fact that these were not just screens; they were, in fact, apsidal shelters in which a combatant was protected from above as well as from the front.

In this connection, Athenaeus preserves an interesting device, which he calls the *aretē chelonē* (W 38). Schneider all but ignored the short description, claiming it to be an interpolation, and suggesting, in frustration, that *aretē* was a Graecisation of the Latin *aries* (1912, 66). But the passage may conceal a reference to the *pluteus*:

“When the attacker wishes to approach the wall, he sets up the *aretē* tortoise, and with its help brings up the ladders. This *aretē* is a tortoise which is wedge-shaped and rounded in a semi-circle on top, so that whatever falls against the front face easily rolls off.” (Athen. W 38)

This “tortoise” would have resembled a quarter sphere, except that the ground-plan is wedge-shaped, giving it a pointed front (cf. Schneider 1912, 37: “eine Schildkröte die vorn spitz zuläuft”). It could easily be described as *ad similitudinem absidis*, just like Vegetius’s *pluteus*, and like it, it was probably woven from wicker, in order to achieve its rounded shape (cf. Lendle 1983, 146). Of course, the whole device would need protection against fire, probably in the form of raw hides.

2.4 The *Testudo*

Atheneaus’s description of the *pluteus* as a “tortoise” is typical of Greek usage, in which *chelōnai* can take various different forms. Apollodorus calls his version of the *vinea* a “light tortoise”, and describes it as “tortoise-shaped” (W 141). Earlier, he recommends “the tortoise shaped like the prow of a ship (*embolon*)” (W 140) as protection against objects rolled downhill, in conjunction with his oblique ditches (above, p. 97). His description of this device is worth quoting in full, not least because something similar can be discerned on Trajan’s Column (below, p. 195).

“The tortoise which has the shape of a ship’s prow, conveyed by the heavy infantry, is brought up on foot-thick (0.30 m) beams, its form being smooth, or having iron wheels attached to the base, so that, when it is set in position, it is fixed in the ground and is not shifted by collision (*viz.* with objects rolled downhill against it). It will also have a slanting beam at the front, propping it up against capsizing. Therefore, heavy objects will either fall into the diagonal ditches and be carried past, or will strike against the sloping palisade which is arranged diagonally and be deflected, or, breaking on the prow, will roll down on either side and safeguard the space in the middle from the impact. There should be many prows, so that they can be small and easily transported.” (Apoll. W 140-141)

It is clear that the device is shaped rather like a snow-plough, so that objects hitting the front will be deflected to the sides. It would seem reasonable for the prow itself to be iron-plated, since its primary purpose was to intercept heavy objects. The men deploying the device will have crowded into the interior space, and, while it is conceivable that

no roof was necessary, since they were operating uphill, one can well imagine that high sides would be required.

The “smoothness” of the device was perhaps to allow it to be slid into position like a sledge (cf. Lendle 1983, 134), but this would seem unnecessary in light of its “iron wheels”. However, this whole clause is problematic, and is customarily obelized to indicate the possibility of textual corruption. Schneider thought that Apollodorus intended the device to have iron *spikes* (1908, 13), which would be a more practical method of anchoring it down, but Lendle retains the received text, envisaging small iron wheels, which could be pressed into the ground (1983, 134). Of course, the device also has a “slanting beam” to secure it in position; Apollodorus states that the beam was “at the front”, and probably from there it sloped down, within the triangular interior, and dug into the ground (cf. Lendle 1983, 135).

Lendle found confirmation for his interpretation on Trajan’s Column, where three triangular devices are shown, deployed on a hill-side and apparently obstructing some barrels and tree-trunks rolled from above (scene CXIV, casts 307-308 = fig. 43). The conjunction of these objects has inspired many different interpretations, ranging from Tittel’s piston-operated chariots, remotely controlled from concealment (*apud* Cichorius 1900, 228-232; cf. Cichorius 1927), and Richmond’s *festucae*, or “pounding hammers”, used in construction work (1982, 42), to the more prosaic, if equally unlikely, ram-tortoise of Lepper and Frere (1988, 166-167). All of these assumed the Dacians’ improvised missiles to be part of the Roman siege-machine, but once these are separated the true form of the device can be seen.

Lendle was keen to retain Apollodorus’s reference to “iron wheels”, because the Trajanic devices clearly have three, very large wheels. More recently, Blyth has suggested that the sculptor misunderstood the device, adding wheels where none should be (1992, 153), perhaps influenced by an already corrupted text of Apollodorus. In other respects, the devices correspond well to the “ship’s prow tortoise”; in particular, the slanting beam can be seen inside each one, perhaps secured at the base by three stakes.

This was a unique device, designed to meet a particular situation, and was probably grouped with the “tortoises” for want of a better home. Vitruvius and Athenaeus preserve descriptions of the more familiar shed-like *testudo*, which may properly be termed a penthouse on account of its heavy, sloping roof (Vitr., *De arch.* 10.14.1-15.1; Athen. W 16-20; cf. Lendle 1975, 6-25). A ground-frame of cross-beams (the *basis* or *es-charion*) was fitted with four wheels, which could be pivoted to move the machine sideways; vertical walls, rising from the ground-frame on all four sides, supported sloping rafters to carry the pitched roof down to the ground. Lendle has suggested that a transverse ridge allowed the roof to slope to the front and back, with hips to the sides rather than gables (Lendle 1975, 13-15). Two types of shed are described: a “ditch-filling” version (*testudo ad congestionem fossarum*: Vitr., *De arch.* 10.14.1-3; *chelōnē chōstris*: Athen. W 16-18), and a “digging” version (*testudo ad fodiendum*: Vitr., *De arch.* 10.15.1; *chelōnē oryktris*: Athen. W 19-20), designed to move up against the enemy wall for undermining work.

Surprisingly, such a device, identified by the neutral term “shed” in Appendix 1, is rarely mentioned in accounts of sieges (cf. Table 20, pp. 205f.). It is likely that battering-rams were routinely housed in wheeled sheds (below, p. 198), dispensing with the need to mention both elements in what was essentially a single machine. Both sheds and rams are mentioned at Oreus, Gytheum, and Piraeus, but the sheds at Gytheum and Piraeus seem to have been associated with undermining work, and the 60-foot (17.7 m) *testudo* at Massilia was clearly associated with ground-levelling (Caes., *Bell. Civ.* 2.2).

The almost complete absence of the latter type of *testudo* may be explained by the fact that the Romans preferred to construct an embankment for the approach of troops and machinery, rather than levelling the ground like Hellenistic armies (above, p. 135). Liebenam is surely wrong to suggest that the ground would be levelled for the approach of an *agger* (1909, 2243), the function of which, after all, was to create a new ground surface; the levelling at Massilia is better seen as a measure to facilitate bringing the *musculus* forward (see below), while Titus’s levelling of the terrain at Jerusalem was to ensure the army’s unimpeded advance to the outer walls (above, p. 147). Garlan has suggested that the levelling work of these tortoises dispensed with the need for an em-

bankment (1974, 235), but he has surely confused the order of events, with the adoption of the embankment making the “ditch-filling tortoises” redundant.

2.5 The *Musculus*

The *musculus* appears only in the *corpus Caesarianum*, at Alesia, Massilia, Gomphi, and Alexandria. Holmes was rightly sceptical about its occurrence at Alesia (*Bell. Gall.* 7.84), commenting that “if Vercingetorix used *musculi*, we can only say that they were intended to protect his men while they were attempting to fill up Caesar’s trenches” (1914, 100). In the description of Caesar’s defensive measures in Alexandria, “all parts of the town which appeared to be less strong were fitted out with *testudines* and *musculi*” (*Bell. Alex.* 1.2), perhaps as makeshift barriers.

Carter describes Caesar’s *musculi* at Gomphi (*Bell. Civ.* 3.80) as “a long, narrow, moveable shed with a strong roof, under which men could shelter while undermining fortifications or preparing other forms of attack” (Carter 1993, 202), no doubt thinking of Massilia, the *locus classicus*, on which he writes, “the purpose of this [shed], when placed against the enemy wall, was to allow a ram to be used in safety, or saps to be driven from as near as possible to their goal” (Carter 1990, 221).

In fact, Vegetius describes *musculi* as “smaller machines, by which attackers are protected while undoing the palisade of a city; they not only fill the ditch with stones, wood and earth, which have been carried forward, but they also make it solid, so that mobile towers can be moved to the wall without difficulty” (*Epit. rei mil.* 4.16). This sounds very like the ditch-filling tortoise (above, p. 196; Southern & Dixon 1996, 162, wrongly equate it with the *vineae*). However, when Veith categorised the items of siege-machinery according to whether they were used in the approach phase or in the attack (1928, 444), he classed the *musculus* as an assault-machine, like mobile towers and battering-rams, clearly interpreting it as a “digging-tortoise”; he classed *testudines* (i.e., the ditch-filling variety), along with *plutei* and *vineae*, as approach-shelters (“An-näherungsdeckungen”).

The *musculus* at Massilia was an enormously robust device, built of 2-foot (0.60 m) thick timber (Caes., *Bell. Civ.* 2.10); it was wheeled up to the wall, to enable workers to undermine a tower and cause substantial collapse. Thus, Veith is correct to identify such a device as a “digging tortoise”; Vegetius has wrongly assumed the *musculus* to have had a ditch-filling role. Musing on the pitched roof of the Massilia device, Carter comments that “it seems, from the stress laid previously on this feature of the *musculus*’ construction, that a flat roof was normal” (1990, 221), however, a pitched roof was a defining trait of the *testudo*, in order to deflect missiles (cf. p. 196).

3. Battering-rams

A pitched roof was essential in the specialised ram-shed, firstly, because of its exposed position at the wall-face, and secondly, to provide a stable frame from which to suspend the ramming-beam. Apollodorus explains both points in his instructions, addressed to Trajan:

“If we wish to shake a tower or gate or wall with a battering-ram, we shall make tall ram-carrying sheds on wheels, which carry the suspension of the battering-ram, so that the impact will be forceful; for, the higher the suspension, the greater the distance which the battering-ram is drawn back, and, the further it travels, the harder it will strike. But the shed should only be tall in appearance, and not massive (overall), so that it is easily moved; it should be twice as high as it is wide, in order to have a sharp ridge and almost vertical sides, so that heavy weights thrown down will not just slide off, but will rebound; and it should have a projecting roof, leaning towards the wall, in order to receive heavy weights thrown down onto the ram, and divert (them) to either side.” (Apoll. W 153-154)

Having described the shed which carries the ram-beam, Apollodorus then refers to “the one behind, of lesser height, for the crew, and two other smaller ones behind, necessary for their safe passage” (W 155). The functional simplicity of this arrangement is absent from the ram-sheds described by Vitruvius and Athenaeus. One machine built by Diades, an engineer of Alexander the Great, was 30 cubits (13.9 m) wide, 40 cubits (18.5 m) long and 16 cubits (7.4 m) high, and incorporated a three-storey *turricula*, ac-

commodating arrow-firing artillery and, on the lowest floor, a water-supply for dousing the machine in the event of fire (*testudo arietaria*: Vitr., *De arch.* 10.13.6; *chelōnē krio-phoros*: Athen. W 12-14; cf. Lendle 1975, 33-47). Philip V used something very similar at Echinus (Polyb. 41.1-6), but the Romans do not appear to have used such monsters (*pace* Connolly 1983, 79, depicting a variant of Diades's machine, set on rollers, as typical of a first-century Roman machine).

Siege-machinery is depicted on the Arch of Septimius Severus in Rome, including ram-sheds on Panel 2 (fig. 45a), which is thought to depict events from the First Parthian War (Brilliant 1967, 179-180). The machine in the middle of the top half is badly eroded, but in the bottom-left quadrant a battering-ram can be seen, protruding from a gable-ended shed. Interestingly, there appears to be a second shed behind it, suggesting the passageway which Apollodorus mentions. The ramming-beam is clearly tipped with an effigy of a ram's head, which corroborates Josephus's description of the machine.

“It [*viz.* the battering-ram] is an immense beam resembling the mast of a ship; it is capped at the front with a mass of iron, modelled like a ram's head, from which it takes its name. It is hung in the middle by ropes, like one of the beams in balancing scales, sustained by firmly based uprights on each side. Pushed back by a crowd of men, and swung forwards by them in a mass, it strikes the wall with the projecting iron.” (Jos., *Bell. Jud.* 3.214-216)

The mention of uprights is often misunderstood as implying a fixed structure (e.g., Hengst 1999, 33: “the *aries* is suspended from a beam that rests upon two posts fixed in the ground”), but Josephus has simply omitted to describe the wheeled shed, without which the machine could never have advanced safely to the wall. In fact, he appears to draw a distinction between the *krios*, or ram-beam proper, and the *helepolis*, which presumably encapsulates the ram and its shed. (Josephus uses the latter term for Titus's battering-machines at Jerusalem: *Bell. Jud.* 5.275, 279, 281 *et al.*) That there was some form of shed is clear from Josephus's statement, that “others brought up the ram (*krios*) (which was) hedged around with continuous wickerwork (panels) and, on top, raw

hides, as protection for them and for the machine (*mēchanēmata*)” (Jos., *Bell. Jud.* 3.220).

Once it reached its action-station, the wheels would need to be chocked in place to prevent the machine from rolling back. In fact, Apollodoros appears to suggest that, once his ram-shed reached the wall, the entire frame was raised on wedges:

“Beside the wheels that carry the shed, wedges are inserted under the timbers, to support it with stability; for, in this way, the pivots of the wheels [i.e., the axles] will not carry the machine (*ergon*) alone, nor will it [i.e., the shed] be prone to slip with the motion of the ram; whenever it is necessary (for the shed) to move, you must draw away the wedges from underneath.” (Apoll., *Pol.* W 157)

Any machinery employed in proximity to the enemy had to be proofed against incendiary attack. Although the timbers will often have been green, unseasoned wood, freshly felled for the purpose (Hanson 1978, *passim*, esp. 297), and hence would have been difficult to fire (cf. *ibid.*, 304, for the feasibility of burning), nevertheless, the wickerwork cladding, which is so prevalent in all siege-machinery, would have been inflammable. For this reason, Athenaeus recommends that

“all roof parts are covered with planking, ideally of palm wood, but if not, then whichever of the other (types of) wood is springy, except cedar, pine and alder; for these are inflammable and easily broken. The planking is covered on top with finely- and closely-woven, freshly-cut wicker; on top of this are laid hides, stitched together like cushions, and packed preferably with marsh-grass, or the so-called sea-weed, or chaff soaked with vinegar; these (measures) are useful against the blows of stone-projectors and against burning.” (Athen. W 17-18; cf. Vitruvius, *De arch.* 10.14.3)

The fire-proofing properties of seaweed and of vinegar were well-known in the ancient world. Philon, for example, recommends that, if *mēchanēmata* and *chelōnai* are not covered with iron or bronze scales, or with lead tiles, they should be covered with a net

of fresh seaweed, or with sponges soaked in water, or with fleeces moistened with vinegar (Philon, *Pol.* 4.34 = Th. 99). Another technique was to cover the timberwork with a mixture of clay and hair, as Apollodorus recommends (W 156), or with tiles and clay, like the *musculus* at Massilia (Caes., *Bell. Civ.* 2.10); the latter was further protected by raw hides and rags. It seems that such measures were not always taken: after an incendiary attack on the Roman siege-works during Titus's siege of Jerusalem, Josephus describes the Romans "dragging the battering-rams out of the fire, the wicker (panels) over them ablaze" (Jos., *Bell. Iud.* 5.479).

We cannot accurately gauge the size of Roman battering-rams. The monstrous, eight-wheeled machine of Hegetor, with a base of 42 by 28 cubits (19.4 × 13.0 m), allegedly carried a 120-cubit (55.5 m) ram-beam (Athen. W 23-24), although Vitruvius records that it measured 104 feet (30.75 m) (*De arch.* 10.15.5). Schramm was sceptical that such a long beam could work, pronouncing that, if it were suspended in the middle, the front and rear would drag on the ground; he suggested that Athenaeus had meant 120 *feet* (35.5 m), not cubits (1928, 235), but Lendle has suggested that the original Greek may have stated 70 cubits (32.4 m) (1975, 62). Ammianus describes a giant ram which the Persians used at Antioch, probably in the siege of A.D. 260, and then abandoned at Carrhae, on their way home (Amm. Marc. 20.11.11). It was retrieved by Constantius II, a hundred years later, and transported in pieces for use during the siege of Bezabde, but Ammianus records no measurements.

The Persian counter-measures at Bezabde illustrate the customary defence against ramming: they "skilfully ensnared the projecting iron head [i.e., of the giant Roman battering-ram] ... with very long cords on both sides, so that it could not gain momentum by drawing back to strike the walls with frequent blows, and also poured down boiling hot pitch" (Amm. Marc. 20.11.15). This technique, of immobilising the ram-beam by lassoing it with several ropes, was already practiced by the Greeks (e.g., during the Spartan siege of Plataea, Thuc. 2.76.4; cf. Aeneas Tacticus 32.4; Philon, *Pol.* 1.51 = Th. 83), and Livy expresses surprise that the defenders of Heraclea did not attempt the same tactic (36.23.2). At Bezabde, in the ensuing *mêlée*, the Persians succeeded in burning the Roman machinery, despite its fire-proofing (cf. Amm. Marc. 20.11.13); only the

great ram was salvaged, when the Romans managed to cut the cords that were entangling it, and drag it away from the flames.

4. Siege towers

After an isolated mention at Lilybaeum, mobile towers do not figure in Roman siegecraft for another fifty years, and, as with the alleged stone-projector (above, p. 163), one wonders whether the equipment used by the Romans on Sicily might have been supplied by their ally, Hiero. In support of this, it is worth noting that the equipment is said to have been old and inflammable, hence it was not built from freshly-felled, green timber (above, p. 200). Towers next appear at Atrax, Leucas, and Heraclea, perhaps under Macedonian influence, though the Romans had ample opportunity to learn from the Carthaginians, also. Thereafter, they occur frequently in Roman operations (cf. Table 20, pp. 205f.).

Zosimus describes the contraption (*mēchanēma*), which Julian built in A.D. 363 at Pirisabora, as follows:

“Having bound four very large timbers to one another with iron, and having produced from these the shape of a rectangular tower, and having set it over against the wall of the citadel, and, by the gradual addition of height, finishing up at the level of the wall, he deployed archers on it, and men firing stones and missiles from machines.” (Zos., *Hist. nova* 3.18.3)

Telling the same story, Ammianus Marcellinus calls the machine a *helepolis*, “by the use of which Demetrius the king, in vanquishing many cities, became known as ‘Poliorcetes’” (24.2.18). Marsden understood the term simply to be “the technical designation for large mobile siege-towers designed to carry other smaller engines”, but excluding rams, on the grounds that “these were usually fitted in special towers – *chelōnai krio-phoroi*” (1971, 85). In what is surely an instance of Homer nodding, he seeks to prove that the enormous Hellenistic siege-towers continued in use, by citing Onasander’s list of siege-machines (*Strat.* 42.3: “battering-rams, *helepoleis*, *sambucae*, wheeled towers, ditch-filling sheds, catapults”), Ammianus’s problematic description of a *testudo*

“which the Greeks call *helepolis*” (23.4.10-13), and Josephus’s idiosyncratic use of the term (e.g., Jos., *Bell. Jud.* 2.553; 3.121; cf. above, p. 199, for the meaning “ram-shed”).

Athenaeus and Vitruvius mention two siege-towers built by Diades (cf. above, p. 198), one 60 cubits (27.75 m) high, the other 120 cubits (55.5 m) high, designed to be transported in sections (Athen. W 11-12; Vitr., *De arch.* 10.13.4-5). This was a useful feature for armies operating in unwooded terrain. Disassembled equipment was probably always carried, for example, during the many Parthian and Persian expeditions; certainly, according to Zosimus (3.13.3), Julian’s Euphrates fleet in A.D. 363 transported “wood for machines (*mēchanai*) ... and already-constructed siege-machinery (*poliorkētika mēchanēmata*)” (cf. Amm. Marc. 23.3.9).

Like Diades’s towers, the *purgos* described by Apollodorus for Trajan is principally a protected staircase to raise troops to battlement level, where they can cross using an assault-bridge. Apollodorus describes a structure, 16 feet (4.9 m) square, rising to 40 feet (12 m) in the first instance, but able to be gradually heightened by using combinations of short timbers (Apoll. W 164-167). As with the sheds (above, p. 201), the tower is coated with clay, then draped with raw hides (W 173). Furthermore, Apollodorus specifies an ingenious system of ox intestines attached to water-skins, in order to spray water wherever the machine catches fire (W 174).

Vegetius (*Epit. rei mil.* 4.17) describes a less innovative, more workmanlike structure, probably reflecting Flavian practice (above, p. 157). It can immediately be seen that his *turris ambulatoria* is a more robust machine, designed to carry a battering-ram at ground-level, an assault-bridge at battlement-level, and a crowning platform for archers to provide covering fire. He envisages different base-dimensions, 30 feet (9 m), 40 feet (12 m), and 50 feet (15 m) square, depending upon the required height, and specifies a covering of raw hides and layers of padding. He appends an extraordinary variation, whereby a supplementary *turricula* is concealed inside the tower, and suddenly hoisted into position, if the defenders try to heighten their walls (*Epit. rei mil.* 4.19).

A Roman siege-tower can be discerned on Panel 4 of the Arch of Septimius Severus in Rome (fig. 46a), which is thought to depict events from the Second Parthian War (Brilliant 1967, 181-182). The machine in the bottom-left quadrant clearly incorporates a battering-ram (cf. fig. 46b). The tower built by Caesar at the town of the Atuatuaci perhaps incorporated a battering-ram; Silva's tower at Masada certainly seems to have done.

Unfortunately, the historians record little which relates to the operation of these machines. At Uxellodunum and Alexandria, there were ten-storey towers; at Jotapata and Jerusalem, there were three 50-foot (15.4 m) towers; and at Masada, the tower was 60 cubits high (28 m). One of Caesar's towers at Ategua was burnt up to the third storey, and perhaps had not been properly fire-proofed; the towers at Jotapata, Jerusalem and Masada were all clad in iron, which must have added considerably to their weight, but guaranteed their invulnerability. In fact, one of the towers at Jerusalem collapsed during the night, and, if this was not due to enemy sabotage, then the framework had perhaps been badly assembled.

Nowhere is it stated how these machines were propelled into action. It is unlikely that they were dragged, either by men or by beasts, as this would have exposed the dragging teams to enemy fire (cf. Procop., *Bell. Goth.* 5.21.4, 22.7-9). Equally, unlike the monstrous Hellenistic machines (e.g., Diod. Sic. 20.91.7-8, on the *helepolis* of Epimachos), there would have been insufficient room within the ground-frame to accommodate the numbers of men required to push the machine (cf. Lendle 1983, 51). Perhaps most likely is the system whereby pulleys were anchored in a forward position, under cover of one type of shelter or another, and cables were run from the siege-tower through the pulleys and back to the rear, where hauling teams could pull the tower up to the forward position (cf. Lendle 1983, 51 n. 60). It is difficult to imagine an alternative method of hauling an armoured tower up the 19° slope at Masada (above, p. 154). In general, embankments will have been as level as possible for this reason (cf. above, p. 144).

	Cat. No.	Comment
Panormus	42	battering-ram
Lilybaeum	44	galleries / towers / battering-rams
Ausetani	47	screens / shelters
Casilinum	48	shelters / miscellaneous
Syracuse	50	screens / miscellaneous (+ shipboard towers & sambuca)
Tarentum	52	shipboard artillery (+ miscellaneous machines)
Anticyra	54	shipboard artillery (+ miscellaneous machines)
Locri	56	artillery / miscellaneous
Oreus	58	artillery / miscellaneous
Utica	64	miscellaneous / battering-rams / artillery (+ shipboard tower)
Oreus	68	sheds / shelters / battering-ram / artillery
Eretria	70	shipboard artillery (+ miscellaneous machines)
Atrax	71	battering-rams / tower
Corinth	73	battering-ram
Elatea	74	battering-ram
Leucas	75	shelters / towers / battering-ram / artillery
Gytheum	76	sheds / battering-rams
Heraclea	78	shelters / towers / battering-ram
Amphissa	81	battering-rams
Phocaea	82	battering-rams
Ambracia	83	shelters / battering-rams / miscellaneous
Nesactium	87	shelters
Haliartus	88	battering-ram
Heracleum	89	miscellaneous machines
Delminium	91	artillery
Nertobriga	92	miscellaneous machines
Intercatia	94	battering-rams
Carthage	95	battering-rams / machinery (= sheds?)
Hippagreta	96	miscellaneous machines
Pallantia	101	miscellaneous machines
Numantia	102	artillery
Suthul	103	shelters
Thala	106	shelters / tower / battering-rams
Muluccha River	108	shelters / artillery
Piraeus	111	sheds / battering-rams / artillery
Themyscira	116	towers
Heraclea Pontica	117	shed / battering-ram
Tigranocerta	120	miscellaneous machines
Jerusalem	122	towers / artillery / machines (= battering-rams)
Noviodunum	124	shelters / towers
Atuatuci	126	shelters / tower / battering-ram
Sotiates	128	shelters / towers
Avaricum	132	shelters / towers / artillery
Uxellodunum	135	shelters / tower / artillery
Pindenissus	136	shelters / tower / artillery
Massilia	139	screens / shelters / galleries / towers / artillery / shed
Gomphi	144	galleries
Alexandria	145	shelters / sheds / galleries / battering-rams / artillery
Ategua	149	shelters / towers / artillery

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Table 20: Roman machinery explicitly mentioned at sieges

	Cat. No.	Comment
Xanthus	154	towers / machinery
Jerusalem	159	towers / machinery (= battering-rams)
Praaspa	160	miscellaneous (battering-ram is destroyed)
Metulum	161	tower(s?)
Uspe	172	towers
Volandum	173	artillery
Jerusalem	176	battering-rams (unused) / artillery (unused?)
Jotapata	180	screens / towers / battering-ram / artillery
Gamala	183	battering-rams / artillery
Placentia	186	screens / shelters
Jerusalem	189	screens / battering-rams / towers / artillery
Masada	191	tower / battering-ram
Sarmizegethusa	193	ship's prow sheds (cf. pp. 194f.)
Hatra	201/202	miscellaneous machinery
Aquileia	203	miscellaneous machinery
Mediolanum	207	miscellaneous machinery
Byzantium	214	towers / battering-rams
Bezabde	217	shelters / battering-rams / artillery
Aquileia	218	screens (+ shipboard towers & battering-rams)
Anatha	219	miscellaneous machinery
Pirisabora	222	shelters / battering-ram / artillery / tower (unfinished)
Maiozamalcha	223	shelters / battering-ram / artillery
Fort near Seleucia	224	shelters / miscellaneous

Table 20 (*contd.*): Roman machinery explicitly mentioned at sieges

Chapter 7: Conclusions

When the writer, Varro, recommended (tongue-in-cheek) that “*Romanus sedendo vincit*” (*Res rust.* 1.2.2), he was alluding to the strategy of *sedendo et cunctando*, adopted by Q. Fabius Maximus in his campaign against Hannibal in 216 B.C. (Livy 22.24.10, 39.15). Unfortunately, Schulten decided to apply the maxim to the Roman strategy at Numantia, whence it has given rise to an entirely imaginary policy of “patient obstinacy and thoroughness” in siegecraft (e.g., Webster 1985, 239; cf. above, p. 32).

This is only one of several myths that surround Roman siegecraft. One particularly persistent notion involves the battering-ram as symbolic initiator of the siege. To cite only the most recent manifestations of this theory, Gilliver has stated that the battering-ram “signalled the moment that the siege began in earnest, and there was no turning back” (1999, 140); Goldsworthy embellishes even further, asserting that “Roman law denied any rights to defenders who failed to surrender before the first ram touched their wall” (2000, 145). Two pieces of evidence are usually cited: Caesar’s ultimatum to the Atuatuci, that he would accept their surrender if they saved him the trouble of bringing up his battering-ram (*Bell. Gall.* 2.32); and Cicero’s general plea, that mercy should be shown, not only to those who have been conquered, but also to those who have surrendered to avoid conquest, “however much the ram struck their wall” (*De off.* 1.35). The idea that this was not only standard practice, but was actually regulated by law, is entirely unwarranted. In fact, it is clear that the fate of a besieged town was entirely in the

hands of the Roman commander, and even his authority could be flouted on occasion (cf. Locha, 204 B.C.; Phocaea, 190 B.C.).

There is another common belief, that “the Romans did relatively little to develop the technical side of siegecraft” (Goldsworthy 2000, 144). This opinion pays no heed to the radical advances in artillery construction, evident from Trajan’s Column and the archaeologically-attested Hatra *ballista*, nor does it take account of Apollodorus’s innovative machines, such as the “ship’s prow shed”. Of course, developments in siege-machinery were subject to practical constraints that would only be removed with the invention of gunpowder and the onset of industrialisation.

However, perhaps the most prevalent myth is the idea that siegecraft “declined” under the Romans. It was no coincidence that the period identified by Sander as the high-water mark of Roman siegecraft (1934, 457) was the period for which we have most evidence, encompassing the *corpus Caesarianum* and Josephus’s *Bellum Judaicum*. Sander’s argument for a subsequent decline rests upon three planks.

First, the technical texts. The fact that Apollodorus’s emperor (in Sander’s opinion, Hadrian) requested designs for siege-machinery proved that there were no competent engineers in Hadrian’s army; Apollodorus was even obliged to send drawings and a trained apprentice to interpret his instructions (Sander 1934, 458). However, as Lamert noted, we know nothing of the circumstances which prompted Trajan’s request (1938, 393), so the inference that it sprang from desperation is unfounded. Worse still, Sander misinterpreted Apollodorus’s siege-tower as a fixed, wheel-less structure, condemning the engineer as an incompetent and lamenting the reduced functionality of an important element in the siege-train (1934, 459-460). He concluded that, if Athenaeus (whom he took to be Hadrianic, too) had to explain the construction of basic machinery, then contemporaries must have been ignorant of these devices (*ibid.*, 461). This spurious argument would have far-ranging consequences for all didactic texts, if it were true.

Second, the historians. The fact that Dio mentions only one engineer in Severus’s army at Hatra, and the fact that the Roman machinery is vulnerable to fire, demonstrated the

degenerate state of Roman siegecraft (Sander 1934, 465 and 468). Of course, timber machinery was always vulnerable to fire (cf. above, pp. 141, 200f.). Sander cited Ammianus as proof that the art of building siege-machinery had finally been lost, and criticised the historian for lacking knowledge of the battering-ram (*ibid.*, 464): he misinterpreted Ammianus's ram as having been carried by soldiers, not suspended from the roof of a shed. However, as Lammert noted (1938, 390), Ammianus's description is quite similar to Josephus's description, which derived from Sander's golden age of siegecraft.

Third, the sculptures. Although believing that the sculptors subordinated historical reality to artistic invention, Sander singled out the ram-beam carried by soldiers on Trajan's Column, and the apparently static siege-tower on the Arch of Septimius Severus (1934, 474). However, he failed to note that the Trajanic battering-ram is depicted as a Dacian, not a Roman, weapon (scene XXXII = fig. 39), and the base of the Severan tower is not visible (fig. 46a and 46b).

Thus, Sander's thesis can be seen to be unfounded. He did not include an archaeological argument, but modern commentators often go to the other extreme, placing undue emphasis on the material remains. This can lead to a skewed picture of siegecraft, as it highlights, above all, the circumvallatory operations, and encourages a belief that sites like Alesia or Masada are somehow representative of Roman siegecraft. This flaw lies at the heart of Davies's archaeologically based study (Davies 2001). In fact, the notion of encirclement with siege-works is so central to his thesis, that any deviations from this norm are consequently classified as aberrant, and all the evidence is shoe-horned into an evolutionary progression, whereby a "blockade camp" strategy was gradually refined into a "contra/circumvallation" strategy.

It is worth quoting his definition of the "blockade camp" in full, as it is crucial to his argument: "a fortified position (or set of positions) established by the besieger, with or without connecting branches or spurs (*bracchia*), with the aim of preventing the re-supply or reinforcement of a defended centre or deterring any sortie or foraging effort mounted by the same, and which could also serve as a garrison base for the besieging force" (2001, 159). The specific examples which he cites are unconvincing: Marcel-

lus's *hiberna* at Syracuse, Scipio's camp at Cartagena, Caesar's camps at Avaricum and Gergovia, Vespasian's camp at Gamala; none of these is indicative of a blockade.

Most scholars would agree that the sieges of Agrigentum and Lilybaeum provide the earliest definite examples of Roman circumvallation (cf. Table 17, p. 96), but Davies categorises them as "extended blockade camp systems [which] were subsequently converted into full circumvallatory works" (2001, 162). He claims that "the first real endorsement of the value of a well-organised (and well-garrisoned) circumvallatory scheme" only appeared fifty years later at Capua, but "following the Capuan success, there was a marked increase in the use of circumvallation" (2001, 185).

We should not lose sight of the statistics behind these sweeping assertions: two, perhaps three, circumvallations during the First Punic War (cf. Table 2, p. 21), and another two during the Second Punic War (cf. Table 3, p. 27). In short, in the space of sixty years, Roman armies had utilised the tactic four (perhaps five) times, as far as we know, whereas more than a dozen towns were taken by storm. Far from a "marked increase" during the fifty years after Capua, circumvallation seems to have been employed only at Orongis and Ambracia, and probably also at Oreus (cf. p. 98). Furthermore, the following fifty years, which separate Ambracia from Numantia, witnessed a strategy of investment only at Carthage, which may well have influenced Scipio's actions at Numantia (cf. above, p. 38).

Unfortunately, Davies is unwilling to classify Scipio's siege-works at Carthage as a circumvallation: "what might otherwise have been thought of as a line of investment was given the character of a blockade camp" (2001, 173; cf. 91f.). However, this is sophistry. Appian characterises the work as an *epiteichisma*, a word which simply denotes a post established in enemy territory, with no possible connotations of blockade; but the purpose of the siege-works was to close off the isthmus, and as such fulfilled the role of a circumvallation (cf. above, p. 100). On the other hand, Davies does include several questionable examples, such as Intercatia, which seems more probably to have involved a cordon of troops (cf. above, p. 35), and Clunia, where Metellus "sat down" to besiege Sertorius (cf. above, p. 44); and I would dispute whether a Hill near Gades, where Lu-

cullus rounded up some raiding Lusitanians by surrounding them with a ditch (App., *Hisp.* 59), really qualifies as a circumvallatory siege.

Having been deployed half-a-dozen times in the hundred or so years from Capua to Numantia, circumvallation disappears again for twenty-five years. This is despite the fact that it was supposedly the “victory at Numantia that provided circumvallation with its most ringing endorsement” (Davies 2001, 94). But Davies takes Metellus’s ditch around Thala as proof that “circumvallation now began to be seen as a useful precursor to more direct approaches, whereby the advantages of isolating the target and, simultaneously, of providing a secure baseline from which further offensive measures might be initiated, were increasingly appreciated” (2001, 186). Apparently not: the next recorded instance is a generation later, when Sulla used the tactic (passively) at Athens and Praeneste, which hardly indicates an accelerating trend. Nevertheless, the circumvallation is so central to Davies’s thinking that he criticises Sulla for not investing Piraeus, too (2001, 93). (Incidentally, he also classifies Fimbria’s incomplete ditch at Pitane as a circumvallation, playing down its utter failure; cf. above, p. 43.)

Davies characterises the period from 49 B.C. to A.D. 14 as an age of circumvallation (“lines of investment (whether single or double) came to dominate the siege landscape, as Table 4 amply demonstrates”; 2001, 103). An explosion of interest during the Caesarian period cannot be denied, but if, “by the end of this period, the use of circumvallation had come to be thought of as a standard procedure of siegecraft” (2001, 98), it is only by Davies. His “standard Caesarian siege approach, whereby assault preparations were put in hand immediately after the circumvallation had been completed” (2001, 186), is not even true of those sieges which actually involved a circumvallation, far less Caesarian sieges in general. In this regard, my Diagram 1 (p. 53) demonstrates two key points. First, more than half of the sample of Caesarian sieges did not involve a circumvallation at all (54%), so Davies’s “standard Caesarian siege approach” is mistaken. And second, out of twelve circumvallations, seven were pursued as blockades (58%), so Davies’s theory, that an assault habitually accompanied a circumvallation, is also mistaken; only Caesar’s siege of the town of the Atuatuci (representing 4% of the sample) conforms to this model.

Following the Caesarian flurry of activity, Davies alleges “an apparent reluctance to engage in any formal circumvallation” thereafter; similarly, the hiatus following the Jewish War demonstrates “the apparent rejection of circumvallation by later commanders”. Anxious to explain this decline, he proposes an “erosion of the hard-won experiences of the past” (2001, 188). This is something of a circular argument. Earlier, he laments the shortage of “troops intimately familiar with the necessary construction skills”, a state of affairs which he blames for “the rarity of circumvallation” (2001, 120). This tactic of choice peters out with final examples at Cremna and Gesoriacum (the latter, incidentally, entirely unwarranted by the evidence). Its disappearance is “symptomatic of a general decline in Roman siegecraft” (2001, 302), and brings a return to the “blockade camp” strategy.

This developmental sequence is entirely imaginary, preserving Sander’s notion of a “Höhepunkt” under a different guise. If the unbiased study of Roman siegecraft demonstrates anything, it is that, once Roman armies achieved some competence during the First Punic War, their performance was remarkably even thereafter (as demonstrated in the various tables). The idiosyncracies of Caesarian warfare inevitably create a blip, but this in no way indicates some inherent superiority.

Ironically, Davies warns that “the excavated work at Alesia and Numantia must not blind us to the fact that these were systems built to meet the challenge of exceptional circumstances [whereas] the usual siege scenario did not require such elaborate provision”. This statement would be quite correct if, by “the usual siege scenario”, Davies meant the dozens of sieges which employed no siege-works at all, but unfortunately he is drawing a distinction with “these instances [where] the works of containment were built to a far more modest standard” (2001, 197).

The approaches adopted by Sander and Davies both suffer from a lack of perspective. Davies’s decision to concentrate on “one particular genre of technical assistance, that of ‘siege works’” (2001, 13), is unfortunate, given that the ancients themselves made no distinctions between the task of erecting an embankment, for example, and that of constructing a siege-tower; both were *opera*, “works” (see above, pp. 97f.), carried out by

the same men under the direction of the same *architecti*, “engineers”. Consequently, Davies fails to grasp the subject fully, by excluding one aspect on the spurious grounds that “engines and machinery were assembled rather than constructed” (2001, 14). Some of his more surprising errors involve machinery, such as the peculiar notion of “artillery-delivered rubble” (2001, 87) forming the harbour mole at Lilybaeum, or the misguided theory that the siege-towers at the same site were “earthfast rather than mobile structures” (2001, 172). Both of these derive from a misunderstanding of the Loeb translation of Polybius, as there is no ambiguity in the original Greek.

In the present work, I have attempted to avoid such imbalance by presenting a systematic and integrated study of Roman siegecraft. On the one hand, archaeology provides a valuable corrective to the literary accounts, demonstrating subtle variations, not only between one site and another, but also within a given site. On the other hand, a study of the literary accounts provides a context for the archaeological evidence, and places it in perspective. A proper appraisal of all the evidence reveals a number of common misconceptions. Circumvallation was not the dominant besieging method; blockade played a minor role; embankments were intended to convey men to their objective, just as often as machinery; and, although generally conceived as ramps, they varied widely in size and scale. Artillery did not play a critical role in Roman siege operations; the material remains of turrets demonstrate that the siting of artillery there is questionable; stone-projectors were not used to demolish fortifications; and the battering-ram remained the most commonly used piece of machinery. Finally, if we seek a comprehensive theory of Roman siegecraft, Onasander sums it up best when he states that “a siege requires the courage of the soldiers, the inventiveness of the general, and the preparation of machinery” (*Strat.* 40.1).

Epilogue:

Mismeasurement in Davies's Siege Works

Coming to the aid of Q. Cicero in 54 B.C., Caesar disguised his troops in a particularly small camp, in order to deceive the enemy (*Bell. Gall.* 5.49). Frontinus records how, in 207 B.C., Claudius Nero utilised precisely the opposite stratagem, leaving a small garrison in charge of a large camp, to conceal from Hannibal the fact that the bulk of his army had moved on (*Strat.* 1.9). Appearances can be deceptive.

So it is with the graphs accompanying Davies's "diachronic overview of the use and development of Roman siege works", which purport to encapsulate the historical data. I have already alluded to his misrepresentation of the data to support a case for circumvallation as the standard Roman besieging technique (above, pp. 209ff.). However, I believe a more fundamental problem must be highlighted.

Despite the fact that Davies has assembled an appendix, apparently consisting of three-hundred historically-attested sieges (they are listed, unnumbered, on pages B1-B128), only a fraction of that total contributes to his tables. This is not immediately apparent, but the disparity can be seen, for example, in his Table 2 (395-200 B.C.): the graphed figures add up to 39, whereas Davies claims to have noted 69 sieges for the relevant period; what has happened to the other thirty sieges? His graph (reproduced as Diagram 2 below, p. 217) demonstrates a predilection for blockade and circumvallation (62%), thus supporting his general thesis. However, my own figures (Diagram 3, p. 217) show that, in this period, the vast majority of sieges (77%) did not occasion construction work of any kind. By excluding these from discussion, the percentages for the remaining

categories (circumvallation, siege-ramps, and so on) become artificially inflated.

However, this is only the beginning of the problem. Davies's Table 5 indicates a further anomaly: the graphed figures add up to 23, but Davies claims to have noted only 18 sieges for the relevant period (A.D. 15-211). In fact, he has (perhaps unwittingly) given certain sieges a statistical "weighting", by graphing not the individual operation itself, but each type of constructional element that he has identified there.

This results in Sulla's siege of Athens appearing twice in Table 3 (199-50 B.C.), once for its circumvallation, and again as an example of "blockade camps" (a mistaken interpretation of Appian's *phrouria*, which are simply guard-posts on the circumvallation); the siege of Piraeus appears four times, based on a (non-existent) circumvallation, (questionable) "blockade camps", an assault-ramp, and mines; the siege of Avaricum appears three times, based on the ramp, (questionable) "blockade camps", and, most bizarrely, mines (which were dug by the defenders, not the Romans); and the siege of Nisibis appears twice, for an assault-ramp and a siege-mound (a duplication which Davies justifies by reference to Dio's plural *chōmata*).

The same error is evident in the other tables. Examples of triple counting include Ategua (Table 4: adding Dio's alleged mine to Caesar's circumvallation and assault ramp), Masada (Table 5: ramp, circumvallation, and "miscellaneous engineering works"), and Maiozamalcha (Table 6: mound, mine, and "blockade camps"). Jotapata appears four times in Table 5 (an assault ramp, a siege mound, a non-existent circumvallation, and unspecified "miscellaneous engineering works"). And quintuple counting occurs twice, for Titus's siege of Jerusalem (Table 5: ramps, mounds, "blockade camps", circumvallation, and unspecified "miscellaneous engineering works") and the siege of Lilybaeum (Table 2: ramps, mines, "blockade camps", circumvallation, and more "miscellaneous engineering works"). Unfortunately, this makes a complete nonsense of the whole exercise.

Direct comparison of Davies's graphs with my own analytical tables is inconvenient, as his chronological divisions cut across my own; in addition, his classification of sieges

according to their “siege works” results in an entirely different scheme from my own strategy-based analysis. Nevertheless, I have drawn together the relevant data from my own tables, and present it in parallel to Davies’s graphs to facilitate comparison (see Diagrams 2-11 below, pp. 217-221). (Note that I omit analysis of Davies’s period 1 [620s to 396 B.C.], on the grounds that the reliability of these early siege narratives is suspect; cf. above, pp. 10ff.) The results provide a valuable corrective to Davies’s misleading thesis, particularly for the later periods (Davies’s Tables 5 and 6; cf. Diagrams 8–11 below, pp. 220f.), by placing the so-called “siege works” into their proper context.

The graphs certainly confirm that Davies’s period 4 (49 BC–AD 14) represents the high-water mark for field-works, but Caesarian sieges exert a disproportionate influence on his figures. Even so, only 43% of the relevant siege-operations involved circumvallations (cf. Diagram 7, p. 219); and it is salutary to note that 44% involved no earth-works at all.

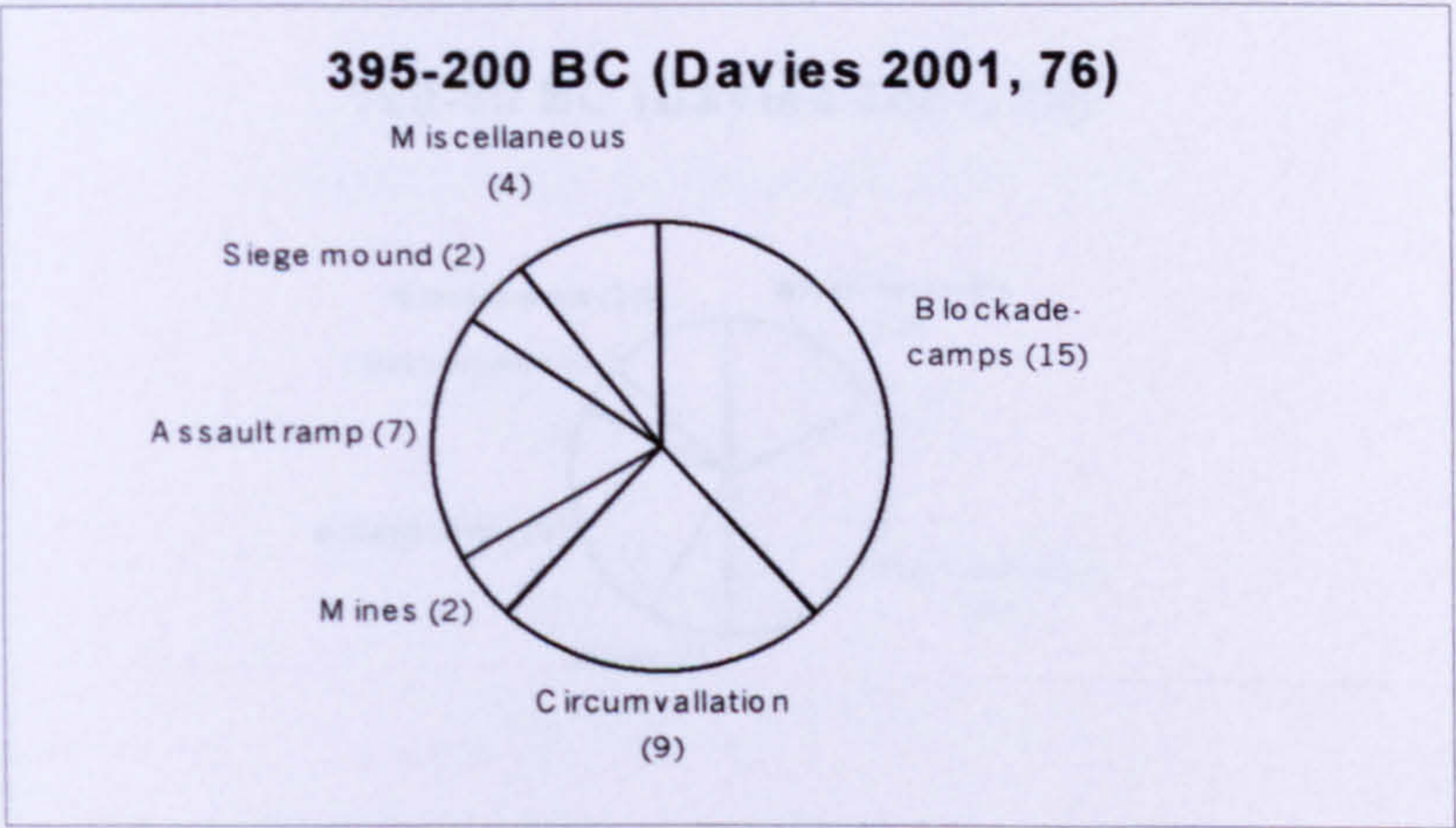


Diagram 2: Davies's Table 2

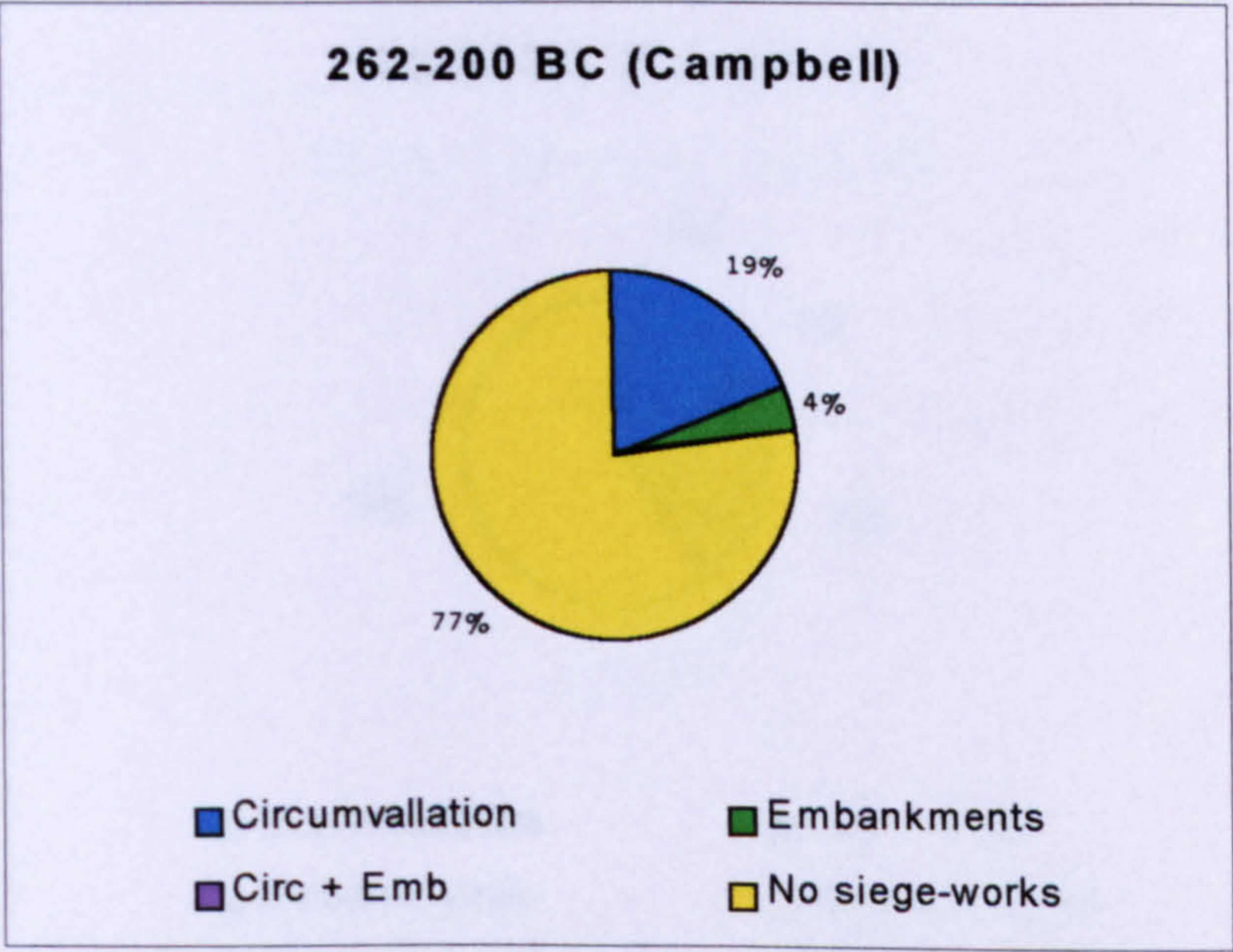


Diagram 3: Relative frequency of siege-works, 262-200 BC

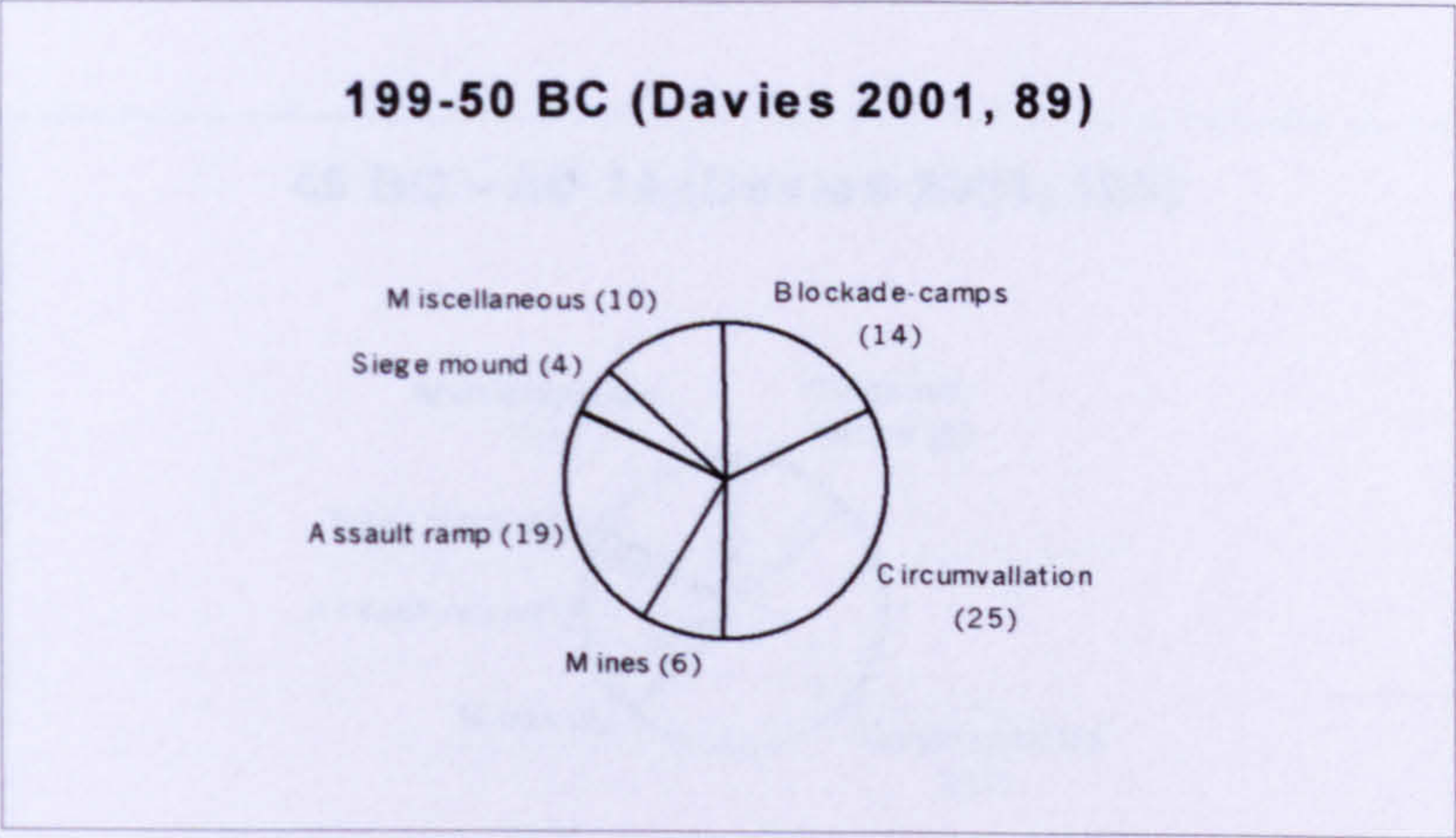


Diagram 4: Davies's Table 3

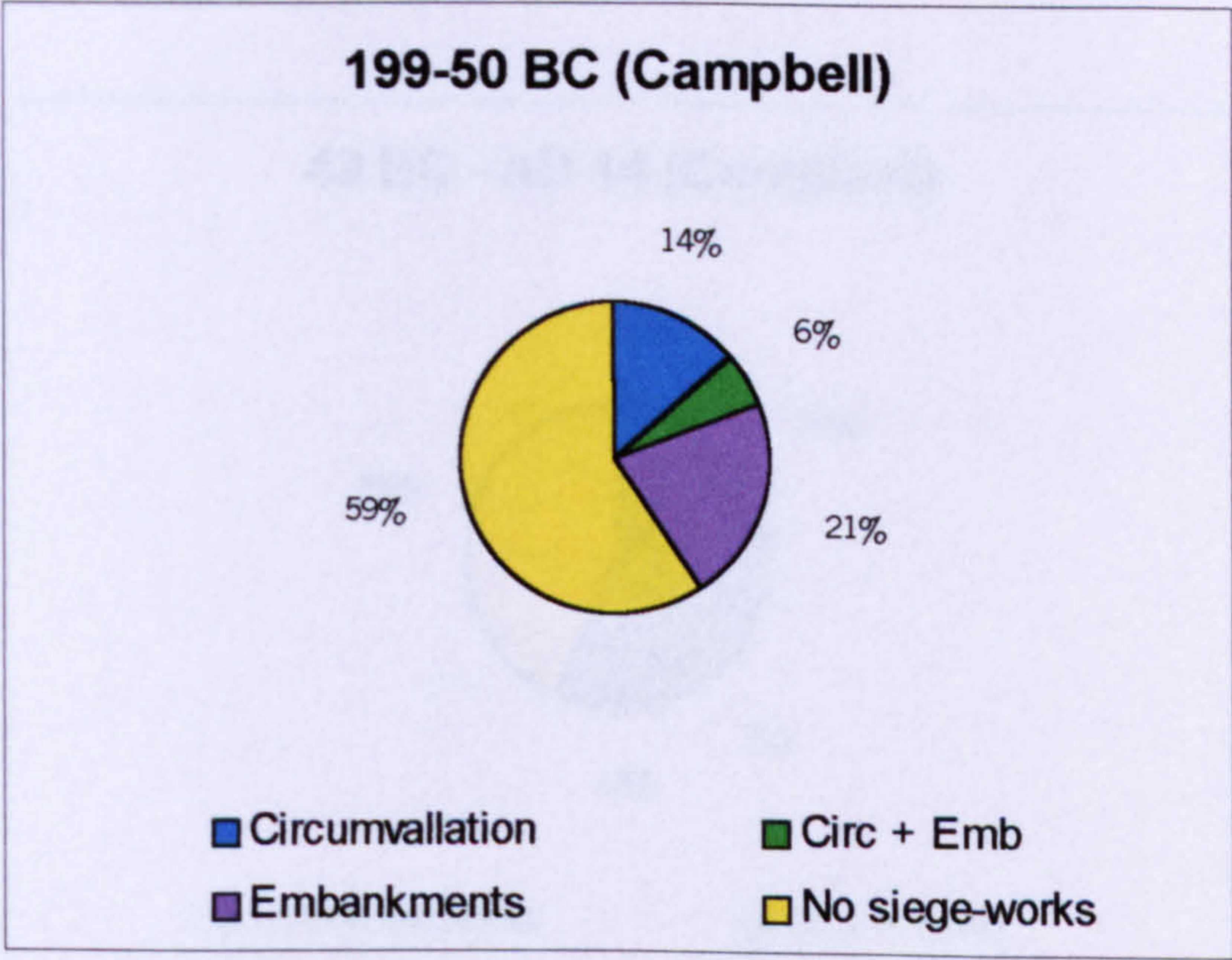


Diagram 5: Relative frequency of siege-works, 199-50 BC

49 BC - AD 14 (Davies 2001, 103)

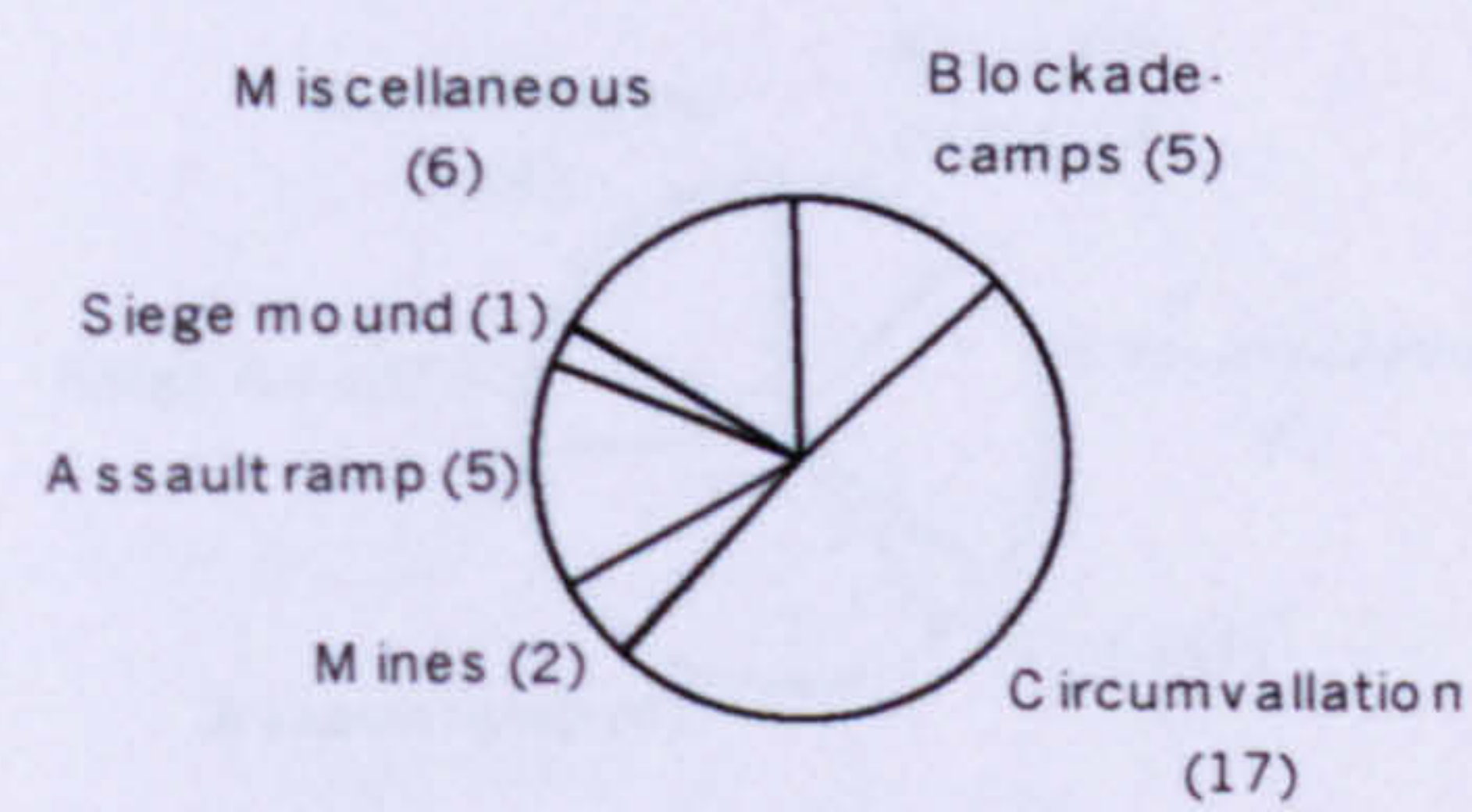


Diagram 6: Davies's Table 4

49 BC - AD 14 (Campbell)

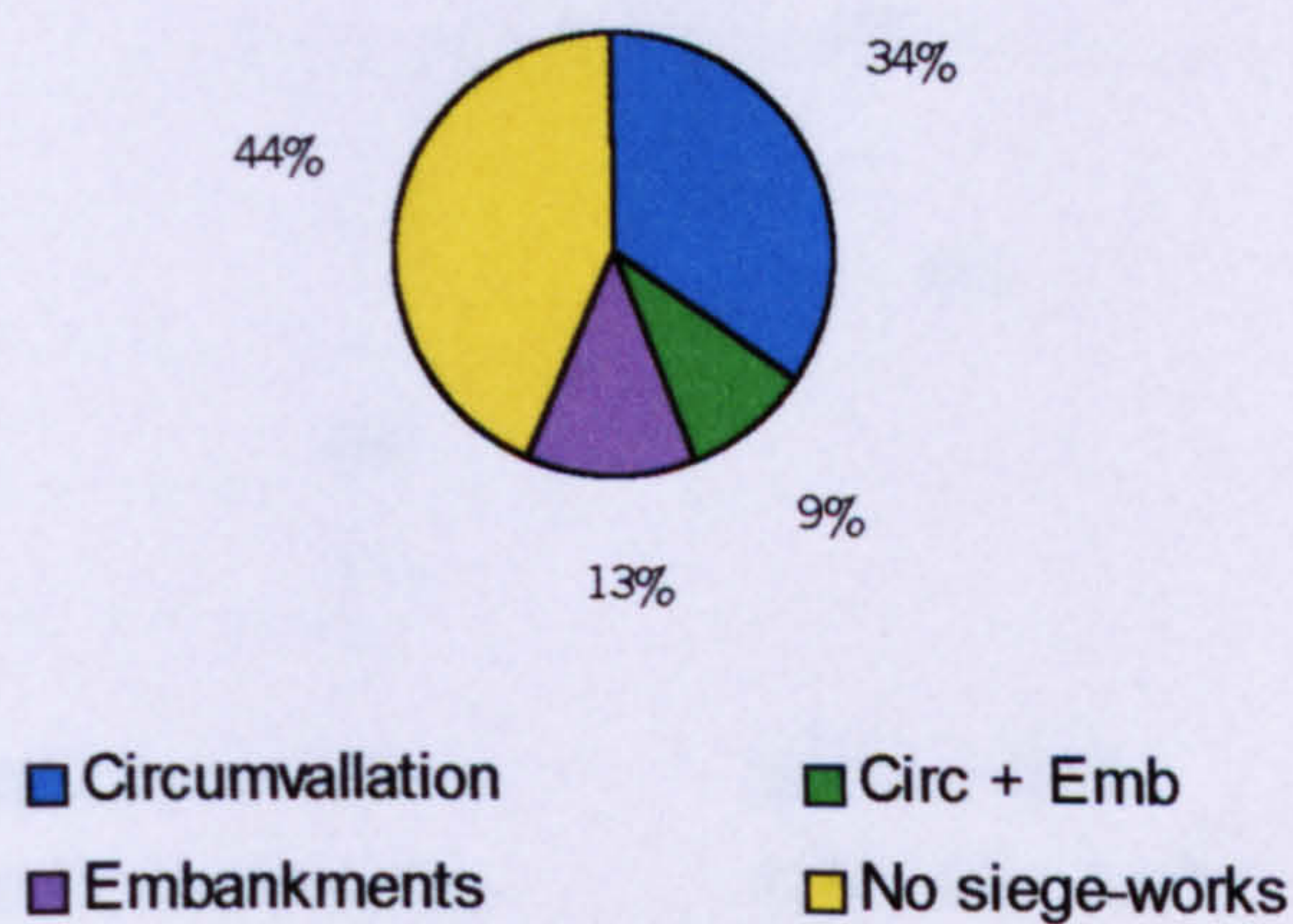


Diagram 7: Relative frequency of siege-works, 49 BC - AD 14

AD 15-211 (Davies 2001, 110)

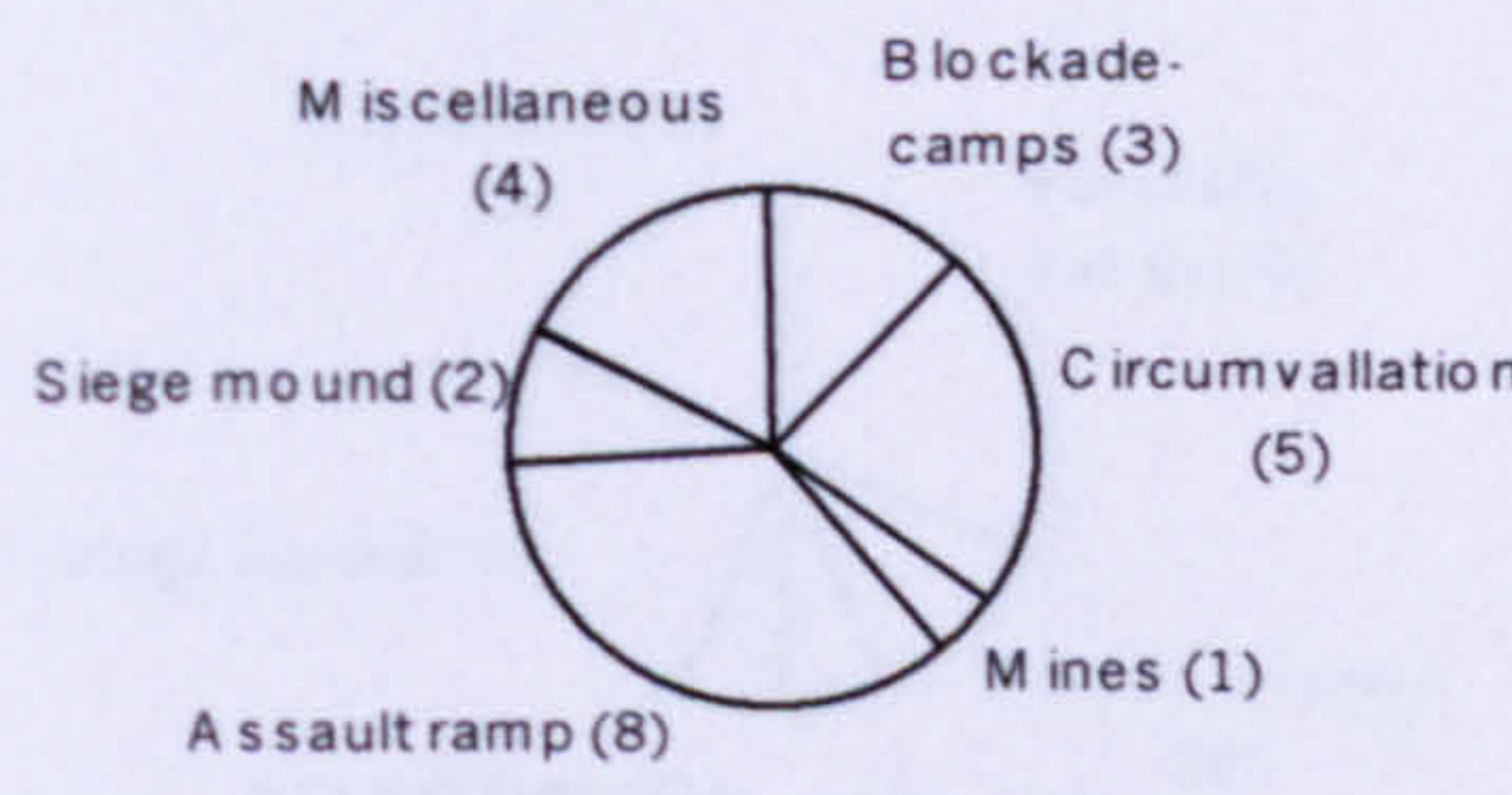


Diagram 8: Davies's Table 5

AD 15-211 (Campbell)

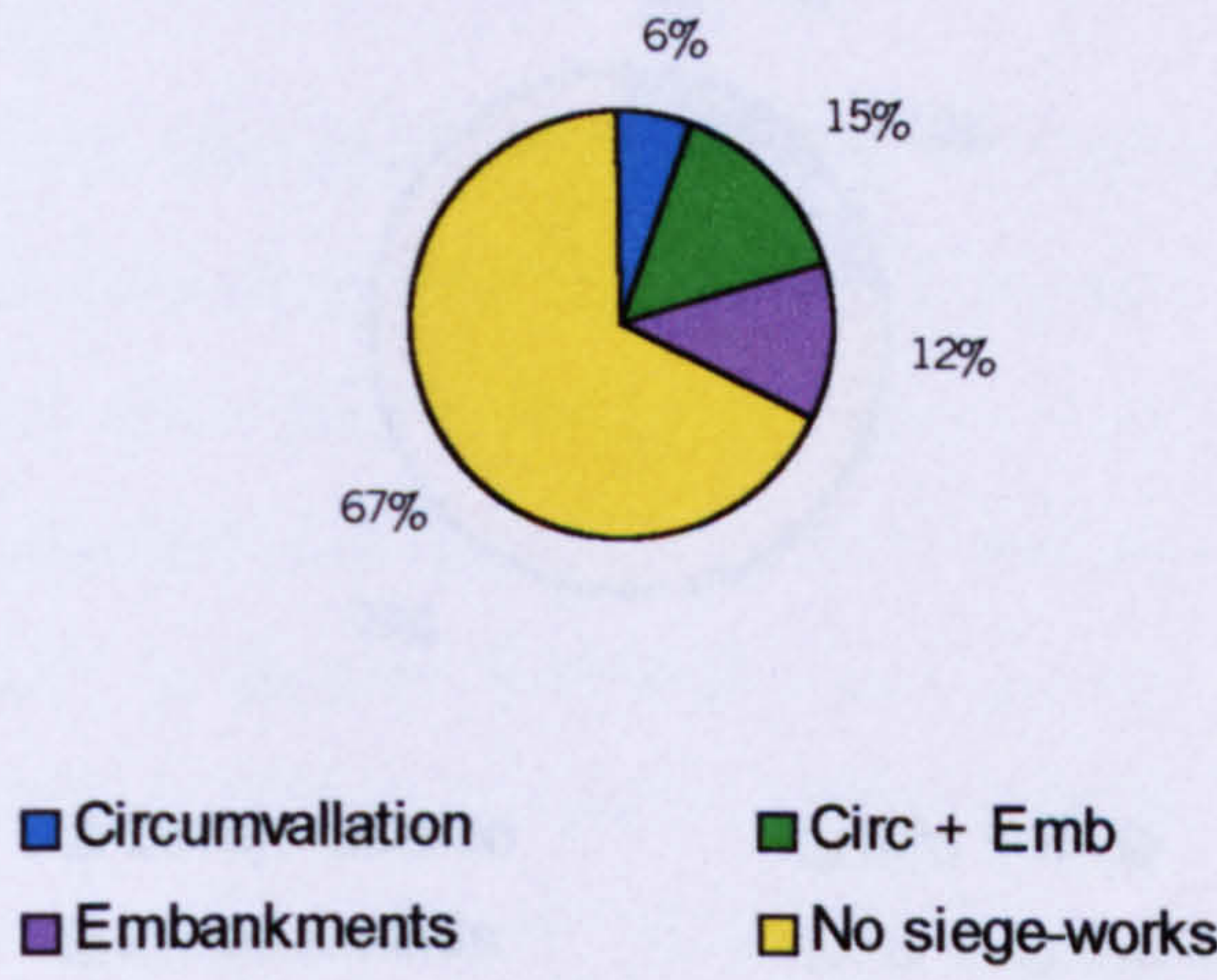


Diagram 9: Relative frequency of siege-works, AD 15-211

AD 212-411 (Davies 2001, 119)

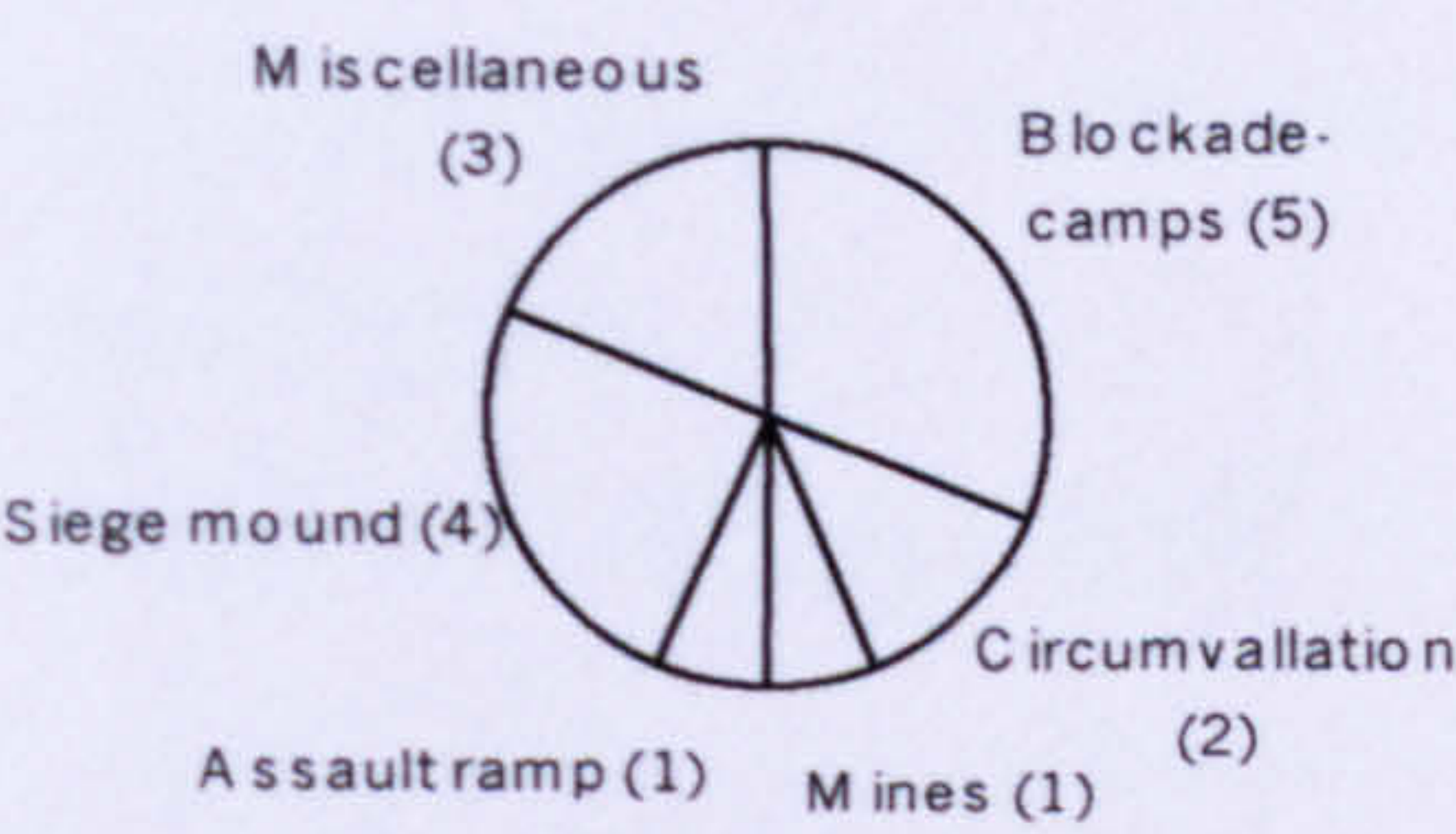


Diagram 10: Davies's Table 6

AD 212-378 (Campbell)

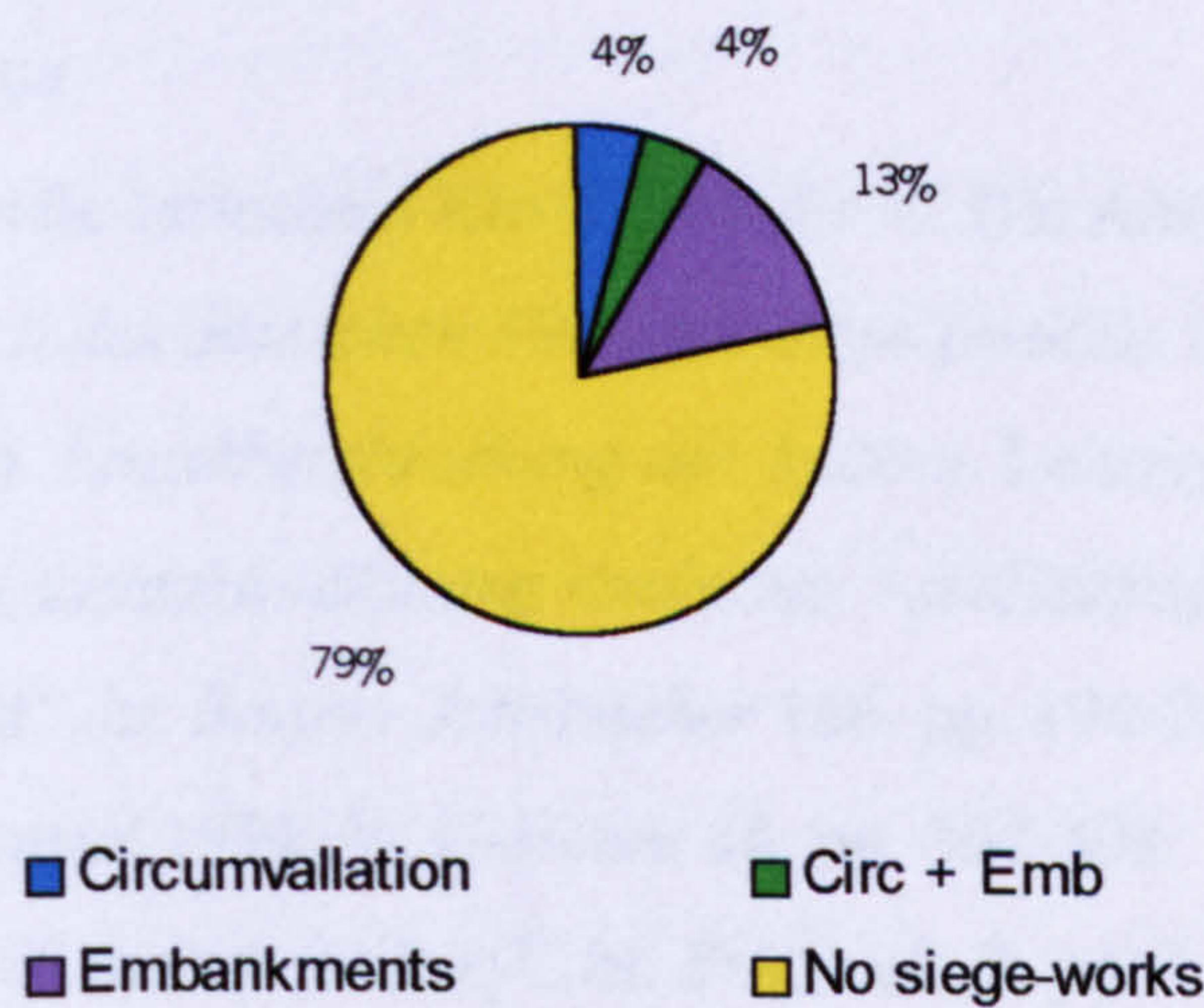


Diagram 11: Relative frequency of siege-works, AD 212-378

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Appendix 1:

Catalogue of Roman Sieges

1. Ardea (Italy), 510 B.C.

King Tarquin attacks the Rutulian capital, Ardea, in order to acquire plunder. The Romans attempt to seize Ardea on the first assault, but when insufficient progress is made, preparations are made for a blockade with the construction of fortifications. The siege is later abandoned.

Sources: Livy 1.57.3; Zonaras 7.11

2. Pometia (Italy), 502 B.C.

Opiter Verginius and Spurius Cassius attempt to take the Auruncan town by assault, then by the use of siege apparatus. The townsfolk launch sorties, setting fire to the Roman shelters and causing heavy casualties amongst the besieging force. The Romans are obliged to withdraw. After an unspecified interval, the Romans return with more troops, having repaired the siege equipment, and are on the point of entering the town when the Pometians offer their surrender. They are treated as if the town had been captured: the leading citizens are executed and the others sold as slaves, the town is gutted, and the land is sold.

Sources: Livy 2.17.1-3; 5-6

3. Cameria (Italy), 502 B.C.

Opiter Verginius mounts a night march on Cameria and, arriving unnoticed at dawn, immediately brings up battering-rams and ladders. Taking advantage of the confusion

within, the Romans break down the gates and scale the lowest part of the ramparts, and capture the town. The soldiers plunder all day and into the night, the townsfolk are sold as slaves, and the town is destroyed.

Sources: Dionysius of Halicarnassus 5.49.3-5

4. Corioli (Italy), 493 B.C.

Postumus Cominius lays siege to the town after an unsuccessful storming attack, and prepares battering-rams, wicker screens and ladders. When a relieving force arrives from Antium, Cominius defeats it with half of his army; the other half repulses a sortie, entering the town hard on the heels of the retreating Coriolans, before they can close the gates. In the ensuing slaughter, women throw stones and tiles from the rooftops, but the Romans set fire to the place, and the townsfolk are enslaved.

Sources: Dionysius of Halicarnassus 6.92.1-6; Livy 2.33.6-9

5. Antium (Italy), 459 B.C.

L. Cornelius encamps near the town and devastates the countryside. When the townsfolk remain behind their walls, he surrounds the place with a ditch and palisade. After a sortie from the town is repulsed, Cornelius breaks down the gate with battering-rams and mounts an escalade of the walls. The town is plundered, the spoil is sold by the quaestor, and the townsfolk are enslaved.

Sources: Dionysius of Halicarnassus 10.21.5-6

6. Fidenae (Italy), 435 B.C.

A. Servilius surrounds the town with a *vallum* and, because it is apparently impregnable to escalade and too well stocked to be starved into submission, he drives a tunnel under a poorly guarded section of the town wall and seizes the citadel from within.

Sources: Livy 4.22.2-6; Florus 1.6.7

7. Labici (Italy), 418 B.C.

Q. Servilius Priscus surrounds the town, which is entered by escalade and plundered.

Sources: Livy 4.47.5; Diod. Sic. 13.7.8

8. Carventum (Italy), 408 B.C.

When the fortified town is captured by the Aequians, the Romans attempt a long and fruitless siege, before abandoning their claim. The disgruntled troops capture the nearby fortress of Verrugo and plunder the countryside.

Sources: Livy 4.55.8

9. Anxur (Italy), 406 B.C.

Cn. Fabius Ambustus frontally attacks the town, while a small force is detailed to make a noisy attack on an undefended sector, in order to draw troops away. Fabius is then able to bring up scaling-ladders and enter the town. The ensuing slaughter of the inhabitants is halted by Fabius, and 2,500 prisoners are taken. Plundering is postponed until Fabius's three tribunal colleagues arrive with their armies.

Sources: Livy 4.59.4-10

10. Veii (Italy), 405-396 B.C.

The siege, begun in 405 B.C., is relaxed in the following year to allow for other campaigning. In the third season, the Romans opt for a blockade rather than an assault, and take the precaution of building earthworks facing both the town, to prevent sorties, and the countryside, to block any external assistance. For the first time, a Roman army builds winter-quarters. Livy refers to a rampart and ditch, towers, shelters, tortoises and other apparatus. An embankment is driven forward and the shelters are almost at the walls, when the Veientes make a sortie and set fire to the apparatus. Reinforcements are sent to repair the lost works and build new ones.

In the fourth season, a relieving force from Capenae and Falerii attacks one of the two (previously unmentioned) Roman camps, sparking a simultaneous break-out from Veii; Roman strong-points are attacked and the defences overrun. In the fifth season, the surrendered camp is retaken and the strong-points strengthened. There are no details of the sixth season.

The seventh season sees a repeat of the fourth, but this time the smaller camp is relieved by a force from the larger camp. In the eighth season, the Romans concentrate on devastating the countryside around Veii. There are no details of the ninth season. In the tenth season, M. Furius Camillus defeats the allies of Veii in battle, builds more strongpoints around the town, and laboriously digs a tunnel up to the citadel. Picked troops enter the city through the tunnel and open the gates. In the ensuing slaughter, women and slaves throw stones and tiles from the rooftops. Camillus orders his troops to spare the unarmed and sack the town; the inhabitants are sold into slavery.

Sources: Livy 4.61.2, 61.3; 5.1.9-2.1, 7.2-3, 8.7-12, 12.4, 13.9-13, 14.6, 19.9-11, 21.10-17, 22.1-8; Plutarch, *Camillus* 2.3-5, 5.3-5; Diod. Sic. 14.16.5, 43.5, 93.2-3; Zonaras 7.20-21

11. Artena (Italy), 404 B.C.

In the course of a blockade, an attempted break-out by the inhabitants is repulsed, and the Romans enter the city in the ensuing confusion. Many Volscians are killed or captured, but some find safety in the citadel, which is too strong to be taken by assault, and unlikely to offer surrender on account of the plentiful provisions. However, a slave betrays the citadel to the Romans; the guards are slaughtered, the garrison forced to surrender, and the town and citadel destroyed.

Sources: Livy 4.61.6-9

12. Anxur (Italy), 401-400 B.C.

An assault on the hill-town of Anxur (retaken by the Volscians in 402 B.C.) is deemed futile, so earthworks are constructed for a blockade. But the Romans easily re-take the town in the following year during a festival when the guards relax their vigilance.

Sources: Livy 5.12.6-13.1; Diod. Sic. 14.16.5

13. Falerii (Italy), 394 B.C.

Camillus blockades the town with fortifications and pickets, but the besieged are well-

supplied. When a schoolmaster from the town offers his pupils to Camillus as hostages, the offer is refused as dishonourable. The siege is subsequently lifted and the town laid under tribute to Rome.

Sources: Livy 5.26.9-10, 27.1-15; Plutarch, *Camillus* 9.2-10.7; Dio 6.24.2-3

14. Sutrium (Italy), 389 B.C.

The townsfolk of Sutrium surrender their town to the Etruscans, but Camillus takes advantage of their lax discipline to recapture it on the same day. The enemy are offered terms if they will throw down their arms. The town is undamaged because it was surrendered under terms.

Sources: Livy 6.3.1-10; Plutarch, *Camillus* 34.1-35.4; Diod. Sic. 14.117.4; Zonaras 7.23.9

15. Cortuosa (Italy), 388 B.C.

The Etruscan town is taken by surprise on the first assault, and is sacked and burned.

Sources: Livy 6.4.9-11

16. Contenebra (Italy), 388 B.C.

After a few days, the town succumbs to the six relays of Roman soldiers, operating around the clock on six-hour shifts. While the tribunes discuss the treatment of booty, the soldiers have already plundered the town, so they are permitted to keep their gains.

Sources: Livy 6.4.9-11

17. Satricum (Italy), 386 B.C.

Camillus surrounds the Volscian town of Satricum with a palisade and erects an embankment and other works in preparation for a siege, but when the Volscians fail to resist he launches an escalade and the Volscians surrender.

Sources: Livy 6.8.9-10

18. Sutrium (Italy), 386 B.C.

The Etruscans break into the philo-Roman town, but are contained within one half by the use of barricades. Camillus feints at the section of walls held by the enemy, to draw them away from skirmishing with the townsfolk; the Romans simultaneously enter the town elsewhere. The Etruscans panic and are slaughtered both within the town and as they flee through the countryside.

Because the object of the siege was the liberation of an ally, the town is not sacked.

Sources: Livy 6.9.7-11

19. Nepete (Italy), 386 B.C.

The Etruscans are admitted by the treachery of some townsfolk. The Romans collect brushwood and bring it up to the walls; the ditch is filled in; scaling-ladders are brought up; and the town is taken on the first assault. The townsfolk are instructed to lay down their arms. All Etruscans, and the Nepetene traitors, are killed, but, because the object of the siege was the liberation of an ally, the town is not sacked.

Sources: Livy 6.9.11, 10.1-5

20. Antium (Italy), 377 B.C.

The Romans cannot contemplate a siege, because they lack the apparatus, so they withdraw after devastating the countryside. Livy comments earlier (6.9.1-2) that such a strong city could only be captured with great provision of artillery and machines.

Sources: Livy 6.32.10-11

21. Tusculum (Italy), 377 B.C.

The Latins capture Tusculum, a Roman ally, and force the townsfolk to seek refuge in the citadel. A relieving force of Romans takes the town by escalade, simultaneously breaking down the gate. While fending off the Romans, the Latins are attacked in the rear by the Tusculans and slaughtered.

Sources: Livy 6.33.7-12

22. Privernum (Italy), 358 B.C.

The Romans plunder the surrounding countryside, so the townsfolk entrench a position in advance of the town walls. However, they flee into the town in the face of a Roman attack and, when the Romans bring up scaling-ladders, they surrender.

Sources: Livy 7.16.6

23. Satricum (Italy), 346 B.C.

The town is encircled by the Romans, taken by escalade, and then destroyed and burned; the plunder is given to the army. Four thousand Volscian troops, having taken refuge there, are sold on behalf of the treasury.

Sources: Livy 7.27.6-7

24. Cales (Italy), 335 B.C.

Although his soldiers clamour to mount an escalade, M. Valerius Corvus is more cautious; he orders the construction of an embankment and shelters and brings up towers. However, a Roman prisoner exploits the lax discipline of a feast day to escape from the town and advises Corvus to attack at once. A vast amount of booty is taken and a garrison posted within the town.

Sources: Livy 8.16.6-10

25. Palaepolis (Italy), 326 B.C.

On the pretext of aiding the townsfolk against the Romans, some Samnites enter, but treat their hosts as captives. A leading Palaepolitan citizen tricks them into leaving the town by night, to raid Roman territory, and another citizen allows the Romans to enter the unguarded town. When they see what has happened, the Samnites depart.

Sources: Livy 8.25.5-26.5

26. Luceria (Italy), 320 B.C.

L. Papirius Cursor besieges the Samnite town, where 600 Roman cavalrymen are held hostage, but his limited supplies are strained with the arrival of his consular colleague, Q.

Publius Philo. The Samnites are also poorly supplied, and when the Romans block all supply routes they seek terms. The Roman cavalrymen are freed, 7,000 Samnites are sent under the yoke (emulating the Roman humiliation at Caudium), and a great quantity of booty is taken.

Sources: Livy 9.13.9-12, 15.1-7; Dio 8.36.23

27. Saticula (Italy), 316-315 B.C.

L. Aemilius Mamercus besieges the Samnite town of Saticula, pitching camp and arranging his troops to face both ways. A Samnite relief force is routed, and a simultaneous break-out from the town is driven back. In the following year, Q. Fabius Maximus Rullianus takes over the siege, places outposts to prevent an attack on the camp, and redoubles the attacks on the town walls. A Samnite relief force provokes a pitched battle, in which they are worsted; a few days later, the town surrenders.

Sources: Livy 9.21.2-6, 22.1-11

28. Sora (Italy), 314 B.C.

M. Poetelius and C. Sulpicius Longus encamp outside the town, where Roman colonists have been slaughtered, but predict that capture will be either long drawn-out (by blockade), or dangerous (by assault) because of the difficult terrain. A deserter advises the Romans to withdraw, leaving men hidden in woodland below the town. He guides ten men by a secret route up to the citadel and spreads panic in the town, whereupon the men concealed outside break in and slaughter the townsfolk. The consuls arrive at dawn to take the town's surrender, and a garrison is left.

Sources: Livy 9.23.2, 24.2-14

29. Nequinum (Italy), 300-299 B.C.

The site is too steep to be stormed or invested, but the town is taken in the following year, when two townsfolk dig a tunnel under the walls and admit a party of Roman soldiers, who break down a gate and allow the army in. The town is plundered.

Sources: Livy 10.9.8, 10.1-5

30. Murgantia (Italy), 296 B.C.

The Romans storm the Samnite town in a single day, encouraged by the promise of plunder: 2,100 Samnites are captured, and the soldiers' booty is sold off for cash.

Sources: Livy 10.17.3-4

31. Romulea (Italy), 296 B.C.

The Romans storm the Samnite town by escalade, capturing and sacking it: 2,300 men are killed, 6,000 are taken prisoner, and the soldiers sell off their booty for cash. Livy comments that no siege-works or artillery were required.

Sources: Livy 10.17.7-9

32. Ferentinum (Italy), 296 B.C.

The troops storm the town, protected by nature and by walls, killing 3,000 of the enemy and collecting more booty.

Sources: Livy 10.17.9-10

33. Feritrum (Italy), 294 B.C.

The townsfolk prefer to depart by night, with everything they can carry, rather than stand siege. L. Postumius Megellus sends cavalry to reconnoitre, in case the deserted town is a trap, and the few remaining goods are taken as plunder.

Sources: Livy 10.34.4-13

34. Milonia (Italy), 294 B.C.

Megellus fails to take Milonia by storm, but captures the town once the siege-works and shelters are at the wall. Fighting continues for four hours; 3,200 Samnites are killed and 4,700 captured; the town is plundered.

Sources: Livy 10.34.1-3

35. Aquilonia (Italy), 293 B.C.

Samnites, seeking refuge in the town, throw stones at the Romans from the walls. The Romans form a *testudo* of shields and break through the gates, but so small a unit is unwilling to advance into the town. When night falls, the Samnites secretly withdraw, and the town is sacked and burned.

Sources: Livy 10.41.12-14, 42.4, 44.2; Valerius Maximus 7.2.5

36. Cominium (Italy), 293 B.C.

The town is encircled by Sp. Carvilius Maximus, who then orders scaling-ladders to be brought up on all sides, and breaks down the gate under cover of a *testudo* of shields.

The Samnites promptly abandon the walls and muster in the town forum, where 11,400 men surrender. The town is handed over to the soldiers to plunder and burn.

Sources: Livy 10.43.1, 43.5-8, 44.2

37. Saepinum (Italy), 293 B.C.

L. Papirius Cursor forces a large Samnite army to take refuge in the town and, by a combination of assaults and siege-works, captures the place: 7,000 are slaughtered, 3,000 taken prisoner, and the town is handed over to the soldiers to plunder.

Sources: Livy 10.45.12-14

38. Agrigentum (Sicily), 262-261 B.C. (cf. fig. 1)

L. Postumius Megellus and Q. Mamilius Vitulus encamp eight stades (1½ km) from the town, which is occupied by the Carthaginians. The foraging Romans are attacked, but repulse the Carthaginians with much loss of life. The Romans now establish two camps, one to the south, one to the west, linked by two lines of ditches, protecting them against attacks from the town and from the hinterland, as well as denying the town supplies from outside. This circumvallation is patrolled from strongpoints, and the army supplied from nearby Herbesus. The blockade is maintained for five months, with the Agrigentines coming close to starvation, before a Carthaginian relief force captures the Roman supply base and arrives at Agrigentum. After a two-month stalemate, during which the

besiegers suffer from dysentery, the Romans defeat the relief force; but they fail to keep adequate watch on the circumvallation, and the besieged Carthaginians are able to fill in the Roman ditches with baskets of straw and escape under cover of night. Entering the unguarded city, the Romans sack the place, taking much plunder, and enslave the 25,000 inhabitants.

Sources: Polybius 1.17.8-19.15; Diod. Sic. 23.9.1; Zonaras 8.10; Front., *Strat.* 2.1.4

39. Mytistratum (Sicily), 258 B.C.

On his arrival in Sicily, A. Atilius Caiatinus finds Mytistratum already under siege by his predecessor, C. Florus. He assaults the fortifications, to no avail, but, when the Carthaginian garrison departs secretly by night, the townsfolk open the gates to the Romans. Unfortunately, they embark on wholesale slaughter, until Caiatinus promises that each man can keep any townsfolk whom he captures, whereupon the killing ceases and the soldiers concentrate on looting. The city is burned to the ground.

Sources: Polybius 1.24.11; Zonaras 8.11.10

40. Camarina (Sicily), 258 B.C.

Caiatinus assaults Camarina, which had defected to the Carthaginian side. He captures the town by bringing siege-works (*erga*) to bear and throwing down the wall.

Sources: Polybius 1.24.12

41. Aspis (Sicily), 256 B.C.

M. Atilius Regulus and L. Manlius Vulso approach the town by sea and entrench a beachhead. The Carthaginian garrison refuses to surrender, so the Romans make preparations for a siege. However, the inhabitants depart secretly by night, abandoning the town, which the Romans occupy as a base of operations.

Sources: Polybius 1.29.3-5; Zonaras 8.12

42. Panormus (Sicily), 254 B.C.

A. Atilius Caiatinus and Cn. Cornelius Scipio erect siege-works (*erga*) at two separate points, perhaps including a palisade and ditch. A tower by the sea shore is demolished by battering-ram (*krios*) and the Romans force their way through the breach and capture the New Town. The townsfolk surrender the Old Town; 14,000 inhabitants are ransomed at 2 *minae* each, and the remaining 13,000 are sold with the booty. The Romans post a garrison.

Sources: Polybius 1.38.8-10; Diod. Sic. 23.18.4-5; Zonaras 8.14

43. Lipara (Sicily), 253-252 B.C.

Cn. Servilius Caepio leaves the tribune, Cassius, to prosecute the siege, with orders to avoid battle. Cassius mounts an assault with much loss of life. In the following year, C. Aurelius Cotta captures the town, and slaughters the townsfolk.

Sources: Polybius 1.39.13; Zonaras 8.14.7

44. Lilybaeum (Sicily), 250-241 B.C. (cf. fig. 2)

C. Atilius Regulus and L. Manlius Vulso establish two camps, probably on the east and south sides of the town, as it is defended by sea on the north and west sides, and link the camps with a ditch, a palisade and a wall. They advance siege-works (*erga*) against the south-west tower and gradually extend eastwards, demolishing another six towers; all the other towers are attacked with battering-rams. As the Romans push their siege-works further into the city, the Carthaginians dig mines underneath and erect a new wall in advance of the Roman works. Sorties are launched by day and night, in an attempt to burn the siege-engines. Meanwhile, the besieging force is apparently reduced by dysentery.

The Carthaginians thwart an attempt by their mercenaries to hand over the city to the Romans, and a relief force of fifty ships (10,000 men) arrives. The Romans now (if not before) block the harbour with fifteen light vessels loaded with stones; a further blockade of the harbour with stones, jetties and anchored booms is destroyed in a storm. All

attempts to block the harbour fail on account of the depth and current, until a shallow sandbar is located and a mound (*chōma*) piled up.

The Carthaginians launch a coordinated series of dawn sorties, attempting to destroy the Roman siege equipment, but are forced to retreat. (Diodorus alleges that the Romans used a stone-throwing catapult, *petrobolon organon*, against the inner wall: Diod. Sic. 24.1.2.) A storm shakes the Roman galleries (*stōai*) and blows away the wooden towers (*purgoi*), lying in front of them. The Carthaginians are able to set fire to the exposed timbers – “the whole apparatus was so old that it was highly inflammable” – which could not be extinguished on account of the wind, and which illuminated the besieging force to the advantage of the Carthaginian marksmen.

Since only the bases of the siege-towers and the ram-beams survive, the Romans revert to blockade, encircling the city with a ditch and palisade. The Roman naval victory in 241 B.C. ends Carthaginian resistance.

Sources: Polybius 1.41.4-48.11, 52.5, 53.1-7, 55.4; Diodorus Siculus 24.1.1-3;
Zonaras 8.15; Front., *Strat.* 3.10.9

45. Dimallum (Albania), 219 B.C.

When the erstwhile Roman ally, Demetrius of Pharus, seizes the impregnable town, L. Aemilius Paulus and M. Livius Salinator arrive, erect siege-works (*erga*) at various sites and besiege the place. After seven days, the town is stormed and received back into Roman sovereignty.

Sources: Polybius 3.18.4

46. Atanagrum (Spain), 218 B.C.

Cn. Cornelius Scipio lays siege to the capital town of the rebellious Ilergetes; within a few days, they agree to terms and are received back into Roman sovereignty.

Sources: Livy 21.61.6-7

47. Town of the Ausetani (Spain), 218 B.C.

Cn. Scipio spends thirty days blockading a pro-Carthaginian town, but the snow, seldom lying less than four feet deep, buries the screens and shelters (*plutei ac vineae*), giving incidental protection from fire. The town's surrender is accepted on payment of twenty silver talents.

Sources: Livy 21.61.8-11

48. Casilinum (Italy), 214 B.C.

Q. Fabius Maximus (Cunctator) and M. Claudius Marcellus encamp before the Carthaginian-occupied town and suffer casualties when they approach the walls recklessly; Fabius wishes to withdraw but is persuaded to stay by Marcellus. Shelters and all the other siege equipment are brought up (*vineae inde omniaque alia operum machinationumque genera*), whereupon the townsfolk attempt to escape; fifty are relocated to Capua by Fabius, but many more are slaughtered. The town is easily taken and all prisoners sent to Rome.

Sources: Livy 24.19.1-11

49. Leontini (Sicily), 214 B.C.

Claudius Marcellus and Ap. Claudius Pulcher converge on the town, which is harbouring anti-Roman, anti-Syracusan agitators, and take it at the first assault by forcing the gate. The Syracusans receive a false report of the events: the indiscriminate killing of soldiers and civilians, the looting of the town, the property of the wealthy given to the troops, and the scourging and beheading of deserters. In fact, nobody is killed following the capture of the town, and all property is restored to its owners.

Sources: Livy 24.30.1-7; Plutarch, *Marcellus* 14.1-2

50. Syracuse (Sicily), 213-212 B.C. (cf. fig. 3)

The Romans encamp 1½ miles (2¼ km) from the city, and prepare to attack by land from the north against the Hexapylon gate, and by sea from the east against the Achradina wall. Claudius Pulcher moves the siege equipment (*omnis apparatus oppugnandarum*

urbium) up to the wall, but Archimedes has constructed every sort of artillery (*genus omne tormentorum*), and the Romans' wicker screens (*gerra*) are crushed by stones and beams dropped from the walls.

Claudius Marcellus embarks archers, slingers and *velites* on sixty quinqueremes, lashing some together in pairs to carry towers and rams (*turres ... machinamentaue alia quatiendis muris*) and the ladder boarding-bridge (*sambuca*), and assaults the Achradina wall. But Archimedes has arranged loopholes from the top of the wall to the bottom, through which archers and *scorpiones* (*skorpidia*) can shoot from concealment, and has deployed different sizes of artillery (*uariae magnitudinis tormenta*), discharging very heavy stones and lighter, more numerous missiles. Finally, he deploys a crane (*tolleno*), to deal with ships inside the range of the artillery. Marcellus abandons the seaborne attack. Since the land walls are defended by every sort of artillery, and the enemy's steep location favours rolling stones, the Romans resort to blockade. Marcellus establishes a winter camp five miles (7½ km) from the Hexapylon gate.

Finally, in the spring of 212 B.C., a stretch of wall on the north sector is found to be low enough for ladders, but is well guarded, so the Romans mount a nocturnal escalade during a festival. Over a thousand men enter by ladder and a postern near the Hexapylon is broken open; the main gate is forced before dawn, allowing Marcellus to bring the entire army into Syracuse and seize the Epipolae district. Hannibal's general in charge of the city, Epicydes, withdraws behind the walls of the Achradina district. Marcellus encamps his troops within the city, regulates controlled looting, and agrees with Syracusan suppliants that no free men will be harmed. The garrison of the Euryalus fortress surrender.

Marcellus then settles down to invest the Achradina with three camps and pickets (*stationes*), and easily repulses the counter-assaults, launched both by Epicydes in the Achradina, and by the Carthaginians, newly-arrived in the Great Harbour. An outbreak of plague in autumn 212 B.C. reduces the population and decimates the Carthaginian forces. With the escape of Epicydes, the Achradina falls into Marcellus' hands. The city is turned over to the troops to loot, in the course of which Archimedes is killed.

Sources: Livy 24.33.9-34.16, 25.23.2-31.11; Polybius 8.3.1-7.12; Plutarch, *Marcellus* 14.2-3, 15.1-17.3, 18.3-19.3; Frontinus, *Strat.* 3.3.2; Polyaeus, *Strat.* 8.11

51. Arpi (Italy), 213 B.C.

Q. Fabius Maximus the younger encamps half a mile ($\frac{3}{4}$ km) from the town, and chooses to attack a postern on the strongest, and hence least carefully guarded, sector. Under cover of darkness, and during a heavy downpour, six hundred men enter the town by means of ladders, and force the gate open, unheard by the guards, sheltering from the rain. At dawn, the main Roman force enters the town by the broken gate; the houses nearest the gate are seized, as a safeguard against missile-fire from the rooftops. The Arpini turn on the Carthaginian garrison and eject them without bloodshed.

Sources: Livy 24.46.1-47.9; Appian, *Hann.* 31; Frontinus, *Strat.* 3.9.2

52. Tarentum (Italy), 209 B.C.

In 209 B.C., Fabius Maximus (Cunctator) arrives by sea to relieve the Roman garrison, beleaguered by Hannibal in the harbour-side citadel. He equips some of the Roman vessels with machinery (*machinationes apparatusque moenium oppugnandorum*), others with artillery (*tormenta et saxa omneque missilium telorum genus*), and still others with ladders (*machinae scalaequae*).

One of Hannibal's mercenaries betrays the section of town wall under his command. Just before dawn, while the Roman troops at the harbour and in the citadel create a diversion, that section of wall is scaled and the nearest gate opened. Indiscriminate slaughter and looting ensues, and thirty thousand slaves are taken.

Sources: Livy 27.15.4-16.7; Appian, *Hann.* 32-34, 49

53. Capua (Italy), 212-211 B.C.

Q. Fulvius Flaccus and Claudius Pulcher, along with C. Claudius Nero, position three camps around Capua and begin construction of a double ditch-and-rampart system two stades (c. 370 m) from the town.

The Capuans attempting to disrupt the work are driven back into the town, but request aid from Hannibal. The Romans invite them to leave with all their possessions before the circumvallation is complete, but they refuse.

In 211 B.C., with the town close to starvation, Hannibal's arrival in force is coordinated with multiple sorties from the city. The Romans driving the Capuans back into the town come under fire from *ballistae* and *scorpiones* at the gate; but, in a general engagement outside the siege-works, Hannibal is repulsed. The Capuans surrender in desperation; the magistrates are executed, but the town is spared.

Sources: Appian, *Hann.* 37-38, 43; Livy 25.22.7-13; 26.4.1-7.8, 12.1-14.9; Polybius 9.3.1-5.9

54. Anticyra (Greece), 210 B.C.

M. Valerius Laevinus coordinates his attack on Anticyra by sea with a land attack by his Aetolian allies. The Roman fleet is equipped with artillery (*tormenta machinaeque omnis generis*). The town surrenders; the Romans take the booty.

Sources: Livy 26.26.3; Polybius 9.39.2

55. Cartagena (Spain), 210 B.C. (cf. fig. 4)

The town is the main Carthaginian base, where all the equipment, including artillery (*tormenta*), is stored. P. Cornelius Scipio (Africanus) encamps to the north-east, where an access route, 250 feet wide, crosses the encircling lagoon; C. Laelius blocks the harbour with the fleet, equipped with "missiles of all kinds" (Plb. 10.12.1).

The Carthaginians draw up for pitched battle, but are driven back into the town in panic. Seeing that the walls are undefended, Scipio orders ladders to be brought up, but few are long enough, giving the Carthaginians time to re-man the walls. Scipio orders "some to attack the enemy from above, others to push the machines (*mēchanai*) forward from below" (App., *Hisp.* 20), and a struggle ensues at the main gate. The Carthaginians employ "machinery (*mēchanēmata*) and stones and missiles and catapults (*katapeltai*)". At the same time, the ebbing tide lowers the level of the lagoon, allowing five-hundred men with ladders to approach where the wall is poorly defended and enter the town.

They force the gates and allow their colleagues to enter. Seeing the wholesale slaughter, the Carthaginians defending the citadel surrender, and the town is plundered.

The captured goods include catapults (120 large, 281 small), *ballistae* (twenty-three large, fifty-two small), and large and small *scorpiones*. Captured citizens are freed, two thousand craftsmen are enslaved, and the slaves are sent to the fleet as oarsmen. The operation lasted a single day.

Sources: Livy 26.42.6-47.10; Polybius 10.9.7, 11.1-4, 12.1-11, 13.6-16.1; Appian, *Hisp.* 20-23; Front., *Strat.* 3.9.1

56. Locri (Italy), 208 B.C.

Artillery and siege equipment (*omne genus tormentorum machinarumque*) is requisitioned from Sicily, and L. Cincius Alimentus brings a fleet over for a seaborne attack. He constructs siege-works (*opera*), but news of Hannibal's approach encourages the besieged Carthaginian garrison to launch a sortie. When cavalry reinforcements arrive the Romans abandon the siege-works (*opera machinaeque quibus muros quatiebant*) for the safety of their ships.

Sources: Livy 27.25.11-12, 26.3-4, 28.13-17; Frontinus, *Strat.* 4.7.26

57. Orongis (Spain), 207 B.C.

L. Cornelius Scipio (Asiaticus) encamps nearby and, when his diplomacy is rejected, rings the town with a double ditch and rampart (*fossa duplex et vallum*). He attacks with a third of his army, but makes no headway because the walls are well defended; his ladders are pushed away by forked poles (*furcae*) or caught by grappling hooks (*lupi ferrei*). However, an attack by the other two-thirds of Scipio's force causes panic along the walls, and some townsfolk rush out to surrender, but are cut down by the Romans in the heat of battle. Gates are broken open with hatchets and pick-axes (*securae dolabraeque*) and the town is seized. No looting is permitted, but the Carthaginian garrison is captured.

Sources: Livy 28.3.2-16

58. Oreus (Greece), 207 B.C.

P. Sulpicius Galba and his ally, King Attalus I of Pergamum, attack the Macedonian garrison, having made a secret pact with the commander, Plator. The Romans land artillery and machinery (*tormenta machinaeque*) on the shore for a diversionary assault on the five-storeyed tower there, while Plator allows a second Roman force into the seaside citadel. The townsfolk are killed or captured, the town is looted, and the Macedonian garrison departs.

Sources: Livy 28.5.19-6.7

59. Castax/Castulo (Spain), 206 B.C.

Scipio (Africanus) sends M. Junius Silanus to receive the submission of the town, but the Carthaginian garrison refuses, so Silanus encamps outside and requests siege apparatus (*paraskeuē poliorkias*) from Scipio. The latter, having captured Ilourgeia (below, 60), arrives and, dividing his troops into three sections, places a watch on the town. At this, the townsfolk hand over the Carthaginian garrison, and surrender.

Sources: Appian, *Hisp.* 32; Livy 28.19.9; 20.8

60. Ilourgeia (Spain), 206 B.C.

A two-pronged attack with scaling-ladders is repulsed again and again, until Scipio (Africanus) threatens to scale the wall himself, whereupon his men succeed. The operation takes four hours. Light-armed mountaineering troops seize the supposedly impregnable citadel. Wholesale slaughter ensues, and the town is burned.

Sources: Livy 28.19.9-20.7; Appian, *Hisp.* 32; Zonaras 9.10.2

61. Astapa (Spain), 206 B.C.

Realizing that their town is poorly defended, and fearing the wrath of the Romans if they surrender, the Astapians decide to die fighting. All valuables are piled in the town square, with the women and children on top, and firewood heaped all around. All the men except fifty sally out for a fight to the death; the fifty kill the women and children,

and ignite the fire, before committing suicide. When the Romans finally enter, all the townsfolk are dead and their valuables burnt.

Sources: Livy 28.22.2-23.5; Appian, *Hisp.* 33; Polybius 11.24.11

62. Locri (Italy), 205 B.C.

The Romans prepare ladders to the height of the citadel specified by Locrian craftsmen, wishing to betray the Carthaginian garrison. They let down ladders for the Romans to enter the town by night, but, although the Romans seize the citadel, the Carthaginian garrison takes refuge in a second stronghold within the town.

Sources: Livy 29.6.4-8.5

63. Locha (Tunisia), 204 B.C.

After a long siege, Scipio (Africanus) assaults the town with ladders (*klimakes*), whereupon the townsfolk offer their surrender and Scipio orders a withdrawal. But the Romans scale the walls and run amok, slaughtering indiscriminately. Scipio grants the surviving townsfolk safe conduct, denies his men any booty, and punishes three centurions with death.

Sources: Appian, *Pun.* 15

64. Utica (Tunisia), 204-203 B.C. (cf. fig. 5)

Scipio (Africanus) encamps about a mile (1½ km) away, while his ally, Masinissa, draws out and defeats the Carthaginian cavalry. Then he moves up to besiege the town with artillery and machinery (*tormenta machinaeque*), requisitioning more from Sicily, and setting up an *armamentarium* with many craftsmen to make even more.

Offshore, a tower is erected on two lashed-together quinqueremes, from which three-cubit (1.4 m) missiles and large stones are launched. Fortifications (*munitiones*) are constructed, embankments (*chōmata*) raised, and battering-rams (*krioi*) brought up, while the hide covering is stripped from the walls with hooks (*drepanai*). The defenders sally out with firebrands, undermine the embankments, divert the hooks by means of nooses, and thwart the battering-rams by dropping beams on them cross-wise. After

forty days, Hasdrubal arrives with an army from Carthage, and Scipio withdraws to the *castra Corneliana*, a winter camp on a coastal promontory.

In the following spring, a token force is left to watch the town, feigning a seaborne assault by launching ships loaded with siege equipment (*mēchanai, machinae tormenta*que), while Scipio engages the Carthaginian army elsewhere. Some of the beached Roman ships are pulled up to the walls to serve as ramps and bridges (*ita adpulsae muris ut pro aggere ac pontibus praebere; prosagōgas tōn organōn*); the Carthaginian fleet succeeds in towing away sixty.

The action moves elsewhere, and the machinery (*mēchanēmata*) is transported to Hippo, where it is burned having outlived its usefulness.

Sources: Appian, *Pun.* 16, 30; Livy 29.34.3, 35.6-8; 30.4.10-12, 8.1-2, 10.2-21;
Polybius 14.2.1, 7.1, 8.1, 10.9-12

65. Chalcis (Greece), 200 B.C.

C. Claudius Cento mounts a dawn raid on the Macedonian ally. A few soldiers with ladders capture a tower and a section of wall, break down the gates, and admit the main Roman force. A fire is started, which spreads to the *armamentarium*, destroying a huge quantity of war equipment (*ingens apparatus machinarum tormentorum*que); the townsfolk and the Macedonian garrison are slaughtered, and the town is looted and burned.

Sources: Livy 31.23.1-24.3; Zonaras 9.15

66. Celetrum (Greece), 199 B.C.

P. Sulpicius Galba's request for surrender is rebuffed, so he assaults the town, which is situated on a lake peninsula, by sending a *testudo* formation of troops along the narrow causeway. The townsfolk surrender in panic.

Sources: Livy 31.40.1-3

67. Andros (Greece), 199 B.C.

L. Apustius Fullo and his ally, Attalus of Pergamum, anchor in the harbour of Gaurion and request the island's surrender, but the citadel is held by a Macedonian garrison, so

they disembark siege equipment (*apparatus omnis urbium oppugnandarum*), whereupon the islanders abandon the town and flee to the citadel. The Macedonian garrison surrenders on the third day on the promise of safe conduct, and the Romans carry off the plunder, leaving the town to Attalus.

Sources: Livy 31.45.3-8

68. Oreus (Greece), 199 B.C.

Apustius and Attalus attack the Macedonian garrison of Oreus from different directions. The Romans move sheds, shelters and a battering-ram (*testudines et uineae et aries*) against the seaward citadel, while Attalus attacks the wall between the two citadels with mines, under cover of an artillery barrage (*ballistae catapultaeque et alium omne genus tormentorum*). Little progress is made, so Apustius and Attalus withdraw, leaving a force to dig siege-works (*opera*), trusting that more can be accomplished from a blockade (*obsidio et opera*) than from an assault (*oppugnatio*). The battering continues and the wall is breached in many places, allowing the Romans to capture the seaside citadel; the townsfolk and Macedonian garrison withdraw to the other citadel, but surrender after two days. The town is occupied by the Pergamenes, and the prisoners are taken by the Romans.

Sources: Livy 31.46.9-16

69. Carystus (Greece), 198 B.C.

L. Quinctius Flaminius' fleet, along with ships from Pergamum and Rhodes, devastates the town's territory, but, seeing that a Macedonian garrison has been installed, pass on to Eretria (below, 70). On their return, they disembark troops for an assault, but the townsfolk surrender unmolested, and the Macedonian garrison is ransomed.

Sources: Livy 32.17.1-2

70. Eretria (Greece), 198 B.C.

L. Flaminius' combined allied fleet (69, above) assaults the coastal town of Eretria with artillery and machinery (*omnis generis tormenta machinaeque ad urbium excidia*). The

countryside furnishes sufficient timber for the construction of Roman equipment (*opera*), which destroys part of the town wall, but fear of the Macedonian garrison, and hope that Philip will send help, keep the Eretrians from surrendering. The Romans mount a nocturnal escalade and the townsfolk flee to the citadel, where they later surrender. The plunder largely comprises some works of art.

Sources: Livy 32.16.10-17; Zonaras 9.16

71. Atrax (Greece), 198 B.C.

T. Quinctius Flaminius breaches the town wall with battering-rams (*arietes*), but is repulsed by the Macedonian garrison. He orders the clearing of the debris and moves up a large siege-tower (*turris ingentis altitudinis ... multiplici tabulato*), but the breach has been plugged by a phalanx. The Roman embankment (*agger*) is not sufficiently compacted, and one of the tower's wheels gets stuck in a deep rut, so that the tower lists to one side. Flaminius abandons the siege.

Sources: Livy 32.17.4-18.3

72. Daulis (Greece), 198 B.C.

The town, situated on a hill-top, could not be taken by escalade or by siege-works (*opera*), but the defenders are enticed out to skirmish, and, as they retreat, the Romans manage to rush into the town at their heels, before the gates are closed.

Sources: Livy 32.18.7-8

73. Corinth (Greece), 198 B.C.

A three-fold assault is launched by Titus Flaminius, his Achaean allies, and the Pergamene troops of King Attalus. Embankments (*aggeres*) are constructed on all sides, and, when the Roman battering-ram (*aries*) breaches the wall, fierce fighting ensues. At news of the approach of Macedonian reinforcements, the Romans follow Attalus' suggestion to burn the siege-works (*opera*) and withdraw.

Sources: Livy 32.23.4-13; Pausanias 7.8.1; Zonaras 9.16

74. Elatea (Greece), 198 B.C.

T. Flamininus tries to negotiate, but the townsfolk are intimidated by the Macedonian garrison, so he besieges the town using equipment (*opera*). A section of wall is demolished by battering-ram (*aries*) and a Roman cohort enters; other sections of wall are taken by escalade. The garrison flee to the citadel, where they surrender on the promise of safe conduct; the town is sacked.

Sources: Livy 32.24.1-7

75. Leucas (Greece), 197 B.C.

T. Flamininus besieges the town with artillery and the machinery (*omne genus tormentorum machinarumque quae expugnantur urbes*). He erects shelters and towers (*vineae turresque*), and the walls are undermined and breached by battering-ram (*aries*) in many places, but hastily repaired by the townsfolk. Some Romans are admitted by Italian traders living in the town. The townsfolk abandon the defences, allowing the Romans to enter at many points by escalade and through the breaches, and many townsfolk are killed before the formal surrender.

Sources: Livy 33.17.3-4, 9-14

76. Gytheum (Greece), 195 B.C.

L. Flamininus besieges the coastal arsenal, with fleet support from King Eumenes of Pergamum and the Rhodians. In a few days, the seamen have constructed equipment (*opera*) for assaulting the town. The wall is undermined with the assistance of sheds (*testudines*), and battered by rams (*arietes*). A tower is demolished and a section of wall collapses. The Romans feint at a different sector, in order to draw attention away from the breach, but the town surrenders on the promise of safe conduct for the Spartan garrison.

Sources: Livy 34.29.5-13

77. Sparta (Greece), 195 B.C.

T. Flamininus throws a cordon (*corona*) around the town. He equips some of his forces with ladders and others with fire, and launches three simultaneous assaults at the sectors which are unwallled because of their natural defences. Breaking into the town, the Romans adopt the *testudo* shield-formation to ward off missiles, including tiles thrown from roof-tops. The Spartans fire the buildings nearest to the walls, and the Romans withdraw. Over the next three days, the Romans launch harassing attacks, sometimes using siege equipment (*opera*) to block any avenues of escape. The Spartan tyrant, Nabis, agrees to the peace terms already offered by Rome.

Sources: Livy 34.38.1-40.4

78. Heraclea (Greece), 191 B.C.

M'. Acilius Glabrio requests the surrender of the town's Aetolian garrison, but is rebuffed. The countryside offers plentiful timber and the suburbs provide abundant building materials; the siege equipment (*turres arietesque et alius omnis apparatus oppugnandarum urbium*) is constructed in a few days, owing to the rivalry between the four assault groups. They attack with an embankment and shelters (*agger et vineae et omnia supra terram opera*). When they apply the rams, the townsfolk sally out with firebrands to burn the embankments (*aggeres*). The operations continue for twenty-four days, with the Aetolians repairing any wall breaches which the Romans make. Then, a night-time assault at three of the sectors leaves the fourth sector undefended; at dawn, the forces at the fourth sector mount an escalade and the townsfolk flee to the citadel. The soldiers sack the town throughout the morning, before assaulting the citadel, whereupon the townsfolk surrender.

Sources: Livy 36.22.4-24.11; Zonaras 9.19; Appian, *Syr.* 21

79. Naupactus (Greece), 191 B.C.

Acilius establishes a fort (*castellum*) opposite the citadel and divides his forces to surround the rest of the town. The siege is maintained for two months, by which time the

town is near to destruction (*prope excidium*). T. Flamininus arrives and persuades the Aetolian garrison to agree to a truce, so the siege is raised.

Sources: Livy 36.30.6, 34.1-35.6; Plutarch, *Flamininus* 15.6-9; Zonaras 9.19

80. Lamia (Greece), 190 B.C.

Acilius mounts a dawn attack, throwing a cordon (*corona*) around the town. An escalade is attempted, but the townsfolk beat it back with stones and missiles. The attempt is called off at midday, and the troops are rested. Next day, another dawn attack is mounted, which succeeds within a few hours because the townsfolk are exhausted. Half of the plunder is sold, and half distributed amongst the troops.

Sources: Livy 37.4.10-5.4

81. Amphissa (Greece), 190 B.C.

Acilius encamps before the town and begins to attack with siege equipment (*opera*). Battering-rams (*arietes*) are moved up simultaneously in several places, whereupon the townsfolk attack the pickets (*stationes*) and disrupt the troops working the machines (*qui circa opera et machinationes erant*). Discovering that Roman reinforcements are approaching, the townsfolk take refuge in the citadel. The siege is lifted, pending negotiations between Rome and Aetolia.

Sources: Livy 37.5.5-6.4, 7.7; Polyb. 21.4.9-14, 5.13

82. Phocaea (Turkey), 190 B.C.

L. Aemilius Regillus seizes the harbours and tries to negotiate, but is rebuffed. He moves up battering-rams (*arietes*) at two points. Advancing through the breaches or crossing the walls on ladders, the Romans meet fanatical defence, so Regillus orders a retreat. The Phocaeans set about repairing the walls.

The Phocaeans, having failed to obtain help from Antiochus III, are persuaded to surrender, whereupon the Romans begin sacking the town. Regillus tries to restrain them, because surrendered towns ought not to be plundered (*captas, non deditas diripi urbes*)

and, in any case, the decision ought to be the commander's. Regillus restores their town to the Phocaeans and winters the fleet there.

Sources: Livy 37.32.1-14

83. Ambracia (Greece), 189 B.C. (cf. fig. 7)

M. Fulvius Nobilior establishes two camps (*castra*) and a fort (*castellum*) facing the citadel, and connects them with a rampart and ditch to enclose the inhabitants and deny them aid from outside. Reinforcements arrive before the siege-works (*munimenta*) are complete. Nobilior moves equipment (*opera, erga*) against five sectors, and begins to batter the walls with rams (*arietes, krioī*) and pull at the battlements with long-handled hooks (*asseres falcati, dorydrepanai*).

But the defenders use cranes (*tollenones, keraiai*) to drop lead and stone weights and tree trunks onto the rams, and grappling irons (*ancorae ferreae, ankyrai sidērai*) to pull the hooks over the wall and break off their handles. They also launch sorties by day and night, using tow and pitch fire-arrows (*malleoli*) and firebrands; and whenever the wall is breached, the Ambracians defend the gap until it can be repaired. So, in a change of tactics, the Romans start tunnelling under cover of shelters (*vineae, gerra*), and continue day and night, but the increasing heap of extracted earth alerts the townsfolk. They dig a trench parallel to the town wall in the general area of the Roman tunnel and, after hanging bronze sheets on the wall of the trench to detect the vibrations of the Roman diggers, dig a counter-mine. When they intercept the Roman tunnel, an underground battle ensues. (Nobilior later refers to fifteen days of battle, above and below ground, in a speech attributed to him: Livy 39.4.9.) The Ambracians construct a device to fill the Roman tunnel with smoke, and put an end to the mining attempts. Finally, the Ambracians are persuaded to surrender, and the siege is raised.

Sources: Livy 38.4.1-5.5, 6.1-9, 7.4-13, 9.6-14; 39.4.9; Polybius 21.27.1-28.18; Polyaeus, *Strat.* 6.17; Zonaras 9.21

84. Munda (Spain), 179 B.C.

Ti. Sempronius Gracchus storms the town in a night attack, takes hostages, and installs a garrison.

Sources: Livy 40.47.1

85. Certima (Spain), 179 B.C.

Gracchus advances siege equipment (*opera*) against the town, and a deputation of townsfolk request a parley. Gracchus parades his troops to overawe them, whereupon they surrender, pay a fine and provide hostages.

Sources: Livy 40.47.2-10

86. Alce (Spain), 179 B.C.

The town withstands the first assault by Gracchus, but when he advances siege equipment (*opera*) the townsfolk flee to their citadel and surrender shortly afterwards. The Romans take much booty and many prisoners.

Sources: Livy 40.49.2-4

87. Nesactium (Yugoslavia), 177 B.C.

C. Claudius Pulcher encircles the town (*circumsedere*) and brings up shelters (*vineae*). The nearby river is diverted to deny the townsfolk water, whereupon, in despair, they begin to slaughter their women and children. The Romans take advantage of their pre-occupation to scale the walls and capture the town. The survivors are taken captive along with some modest booty.

Sources: Livy 41.11.1-6

88. Haliartus (Greece), 171 B.C. (cf. fig. 6)

C. Lucretius Gallus encircles the town (*circumsedere*) in preparation for an assault. The townsfolk launch sorties to attack the siege-works (*opera*) and, when the ram (*aries*) is brought up, they sabotage it with huge stones and lead weights. A section of wall with two towers is breached, but a new wall is thrown up inside.

Gallus then launches an escalade all around the town, excluding the marshy Kopais. Simultaneously, two-thousand troops are sent up to the breach, to distract the defenders. The latter, in turn, have obstructed it with dry branches which they threaten to ignite, but a sudden downpour removes this danger. The escalade succeeds and there is wholesale slaughter; many flee to the citadel, but surrender next day. Booty is taken and the town destroyed.

Sources: Livy 42.56.5, 63.3-11

89. Heracleum (Greece), 169 B.C.

M. Popillius Laenas tries to negotiate, but is rebuffed, so he attacks the town from land and sea with siege equipment (*opera machinaeque*). Some soldiers approach the peculiarly low town wall under a *testudo* of shields; by standing on top, their companions are able to cross over, and the town is captured.

Sources: Livy 44.9.1-10; Polybius 28.11.1-2

90. Meliboea (Greece), 169 B.C.

When Laenas arrives at the town with five thousand men, the townsfolk defend the walls, dashing his hopes of a storming assault; so he settles down for a blockade (*obsidio*) and prepares equipment (*opera ad oppugnationem*). Hearing that the town is under attack, Perseus sends a relieving force of two thousand men, so the Romans set fire to their equipment and withdraw.

Sources: Livy 44.13.4

91. Delminium (Dalmatia), 156-155 B.C.

C. Marcius Figulus drives the Delmatae into their main stronghold, but he can neither take the place by assault, nor deploy siege equipment (*mēchanēmata*) on account of the terrain, so he sets fire to much of the town with two-cubit (0.9 m) fire arrows shot from catapults. He maintains a blockade while attacking and capturing the neighbouring towns, which are undefended because the Delmatae are mustered at Delminium.

In the following year, P. Cornelius Scipio Nasica oversees the final capture of the town. The fortifications are destroyed and the site turned over to sheep pasture.

Sources: Appian, *Ill.* 11; Florus 2.25; Strabo, *Geog.* 7.5.5; Frontinus, *Strat.* 3.6.2; Zonaras 9.25

92. Nertobriga (Spain), 152 B.C.

When the townsfolk seek terms, M. Claudius Marcellus demands hostages and tribute. The townsfolk promise good behaviour, but continually harass the Roman supply lines, so Marcellus devastates the neighbourhood. When the townsfolk see “machinery (*mēchanēmata*) together with embankments (*chōmata*) advancing”, they petition for peace.

Sources: Appian, *Hisp.* 48

93. Cauca (Spain), 151 B.C.

L. Licinius Lucullus encamps before Cauca and requests the town’s surrender. A skirmish ensues, in which the townsfolk are worsted and, next day, they sue for peace. Lucullus makes various demands, including the stationing of a Roman garrison within the walls. Once the latter are in place, they admit their comrades and slaughter all the adult male townsfolk; the town is sacked.

Sources: Appian, *Hisp.* 51-52

94. Intercatia (Spain), 151 B.C.

Lucullus’s attempt at negotiation is rebuffed, so he devastates the countryside. The town is encircled, embankments (*chōmata*) are begun, and Lucullus tries to provoke a battle, to no avail. The Romans are fatigued from maintaining the cordon, there is sickness from the unusual diet, and many die of dysentery.

Finally, when the embankment (*chōma*) is completed and the wall is breached by rams (*mēchanai*), the Romans are repulsed with losses; the townsfolk repair the wall.

As both sides are now suffering from famine, a treaty is arranged, whereby Lucullus gets hostages, cattle, and cloaks, since the town has no gold or silver.

Sources: Appian, *Hisp.* 53-54; Livy, *Per.* 48

95. Carthage (Tunisia), 149-146 B.C. (cf. fig. 8)

The consuls, M'. Manilius and L. Marcius Censorinus, expecting no opposition from the supposedly demilitarised city, assault the walls with ladders, but are repulsed. Men sent to fetch timber for siege equipment (*mēchanai*) are attacked by Carthaginian cavalry; the Romans construct machines and ladders. The route to the city, situated at the end of a wide isthmus, is broadened and two enormous battering-rams (*duo mēchanai kriophoroi megalai*) are brought up, one of them allegedly powered by six thousand infantrymen, but the breaches in the wall which they create are repaired overnight. The Carthaginians sally out by night to burn the Roman engines and succeed in doing some damage.

Sickness breaks out in Censorinus' camp, near the stagnant lake of Tunis, so he moves nearer the sea; his early return to Rome leaves Manilius dangerously exposed.

In 148, no move is made against Carthage, which continues to receive supplies by land, in the face of the continuing maritime blockade.

Late in 147, the admiral Mancinus mounts an escalade and breaks into the city, but can make no headway. P. Cornelius Scipio Aemilianus, arrives in time to extricate him.

Scipio establishes a camp before Carthage and breaks into the city by night, but withdraws again and digs two ditches with palisades across the 25-stade (4½ km) isthmus.

In addition, facing the city, he builds a 12-foot (3.7 m) wall with parapet and towers; the central tower has a four-storey timber superstructure. The task takes twenty days.

Scipio constructs a mole to close off the harbour, but the Carthaginians cut a new channel to the sea, so he attacks the eastern quay with rams and machinery (*krioi ... kai mēchanēmata*); when the Carthaginians fortify it with towers, he builds embankments (*chōmata*) from which to throw burning sulphur and pitch, and thus captures the quay.

In 146, C. Laelius captures the harbour and Scipio breaks into the Byrsa. The troops spend six days firing the buildings and ravaging the city.

Sources: Appian, *Pun.* 80-81, 93, 95-100, 113-114, 117, 119, 121, 124-125, 127-133; Zonaras 9.26-27, 29-30; Diodorus Siculus 32.14, 24-25; Florus 1.31.7-18; Livy, *Per.* 49, 51

96. Hippagreta (Tunisia), 148 B.C.

Calpurnius Piso assaults the town, which has been intercepting Roman supply ships bound for Carthage. He besieges the town all summer, but the inhabitants twice burn his siege equipment (*mēchanai*) so he retires to winter quarters at Utica.

Sources: Appian, *Pun.* 110; Zonaras 9.29

97. Centobriga (Spain), 142 B.C.

Q. Caecilius Metellus attacks the town, but, when he brings up a machine (*machina*) to demolish the only accessible part of the wall, the townsfolk position hostage children in its path, whereupon Metellus raises the siege.

Sources: Valerius Maximus 5.15

98. Numantia (Spain), 141-140 B.C. (cf. fig. 9)

Q. Pompeius encamps near the hill town, but the townsfolk mount a sortie and destroy a Roman cavalry force. Pompeius then tries to alter the course of the river in order to deny the townsfolk water, but his activities are disrupted. Foraging troops are harassed by the Numantines, and new recruits arriving from Rome fall ill with dysentery, some fatally. Eventually, both sides are exhausted by the siege, and the Numantines are persuaded to give hostages and return prisoners and deserters.

Sources: Appian, *Hisp.* 76-79

99. Numantia (Spain), 138 B.C. (cf. fig. 9)

When M. Popillius Laenas besieges the town, the inhabitants refuse to issue out for combat, so he mounts an escalade (*scalis*). However, seeing that the townsfolk still offer no resistance, he suspects a trap and recalls the ladder parties, whereupon the Numantines finally sortie out, attacking the retreating Romans in the rear.

Sources: Front., *Strat.* 3.17.9

100. Lagni (Spain), 136 B.C.

When Pompeius advances against the town, the inhabitants admit four hundred

Numantine soldiers by night, to bolster their defence. However, becoming alarmed at the situation, the townsfolk decide to capitulate, but Pompeius insists that they surrender their Numantine allies, who, fearing treachery, turn on the townsfolk. Pompeius takes advantage of the confusion to mount an escalade on the undefended town. He kills the noblemen, but releases two hundred of the Numantines, and razes the town.

Sources: Diod. Sic. 33.17.1-3

101. Pallantia (Spain), 136 B.C.

L. Aemilius Lepidus makes an unprovoked assault on the town of Pallantia, constructing siege equipment (*mēchanai*) for the purpose. The siege is protracted, causing famine and dysentery amongst the Romans. Finally, Lepidus raises the siege and departs by night, leaving equipment behind, along with the sick and wounded. Next day, the Pallantines harass the retreating Roman column.

Sources: Appian, *Hisp.* 80-83

102. Numantia (Spain), 133 B.C. (cf. fig. 9)

Scipio Aemilianus and his brother, Q. Fabius Maximus, establish two camps near Numantia; Scipio refuses to risk battle, preferring to reduce the Numantines by famine. A ditch and palisade is dug to protect the troops while they dig a second ditch and palisade behind it, and finally a 50-stade (9 km) wall, eight feet (2.47 m) wide and ten feet (3.1 m) high to the wall-walk, with towers every *plethron* (30.8 m); in a marshy area, the wall is replaced by an embankment (*chōma*). Catapults (*katapeltai oxybeleis kai lithoboloi*) and ammunition (*lithoi kai belē kai akontia*) are positioned on the wall towers. Messengers and signaling procedures are arranged. Appian records seven forts (*phrouria*) around the hill town; Florus records four camps (*castra*). The river Douro, flowing past the town, cannot be spanned by the circumvallation, so a tower is erected on either bank, with timber obstacles moored floating between.

A party of Numantines, using a folding ladder, crosses the wall by night, to seek assistance from neighbouring peoples, but they are betrayed to Scipio. The Numantines seek terms, but Scipio requires absolute surrender, which they are unwilling to offer until

famine and starvation take hold. Some commit suicide, and the remainder are sold; the town is destroyed.

Sources: Appian, *Hisp.* 90-98; Florus 1.34; Frontinus, *Strat.* 2.8.7; 4.1.1, 7.27
Archaeological evidence discussed on pp. 101-104, above.

103. Suthul (Algeria), 109 B.C.

A. Postumius Albinus encamps before Jugurtha's treasury at Suthul, a hill town surrounded by swamp, and prepares for an assault, despite the strong defences and poor weather. Albinus advances shelters (*vineae*) and throws up an embankment (*agger*). Jugurtha pretends to seek terms for surrender, while subverting some of Albinus's auxiliaries. He springs a night-time attack on the Roman camp, breaking in at the point defended by the traitors, and the Romans flee to a nearby hill. Albinus agrees to an unconditional withdrawal, to spare his army.

Sources: Sallust, *Iug.* 37.3-38.10

104. Zama (Tunisia), 109 B.C.

Caecilius Metellus encamps near Zama and surrounds the town; the troops raise a shout, but the townsfolk are resolute. Attempts are made to undermine and to scale the walls, under cover of slingers, but the townsfolk roll down stones and throw stakes and javelins, and a burning mixture of pitch and sulphur; their walls are defended by artillery (*tormenta*).

Next day, Metellus renews the assault, and Jugurtha arrives to attack the camp. While the townsfolk are watching his progress from the walls, Marius launches a violent escalade; the defenders again throw stones, firebrands and other missiles, and the ladders are smashed. On the third day, having made no progress, Metellus raises the siege.

Sources: Sallust, *Iug.* 56.1, 57.1-61.1

105. Vaga (Tunisia), 109 B.C.

The townsfolk murder the Roman garrison and declare for Jugurtha. Metellus's forces make a night march, arriving behind a screen of allied Numidian cavalry with concealed

standards. The townsfolk mistake them for Jugurtha's men and open the town gates. The Romans immediately seize the gates and slaughter the townsfolk. The town is plundered and destroyed.

Sources: Sallust, *Iug.* 66.2-69.4

106. Thala (?Algeria), 108 B.C.

By forced marches, Metellus surprises Jugurtha at the desert town, but the latter escapes secretly by night. Metellus surrounds the town with a ditch and palisade (*vallum fossaque*), and, at two locations, moves up shelters (*vineae*), builds an embankment (*agger*), and erects a tower "to protect the siege-works (*opus*) and the workers". Battering-rams (*arietes*) are applied, and, in the sixth week of the siege, the walls are breached and the town captured. However, when they realize that the town is doomed, the townsfolk burn their valuables before throwing themselves onto the bonfire.

Sources: Sallust, *Iug.* 75.10-76.6

107. Capsa (Tunisia), 107 B.C.

Marius mounts an attack on the desert town, arriving by surprise at daybreak and seizing the gates. He enters the town to restrain his troops from plundering. The townsfolk surrender immediately, but the Romans run amok, killing and burning. The survivors are sold and the booty divided.

Sources: Sallust, *Iug.* 91.3-7

108. Fort on the River Muluccha (Morocco), 106 B.C.

Marius mounts an attack on the isolated fort, situated on a rocky hill which is unsuitable for siege apparatus (*aggeribus turribusque et aliis machinationibus locus importunus*); the only approach route is narrow, precipitous and dangerous. Marius brings up shelters (*vineae*) but, before they have advanced far, they are destroyed by fire and stones. The defenders continually overturn the shelters and burn them, so soldiers can neither move between the shelters without danger, nor advance their apparatus on account of the uneven terrain. After several days, a hidden access route is found on the far side of the

hill. Marius sends a small, lightly-equipped party (including five musicians and four centurions) and simultaneously launches a full-scale assault under a *testudo* of shields, supported by catapults (*tormenta*), archers and slingers. The defenders are by now so audacious that they are operating in front of the walls; when the party arrives in the rear of the fort, blasting their horns, the defenders are cut down as they retreat to the fort.

Sources: Sallust, *Iug.* 92.5-94.6

109. Asculum (Italy), 90-89 B.C.

Cn. Pompeius Strabo places the town under siege, but C. Vidacilius's relieving force breaks through and enters the town, where Vidacilius, in despair, commits ostentatious suicide. The siege is transferred to the command of Sextus Caesar, who pursues it for a year, before Pompeius returns to oversee the final capture of the town.

Sources: Appian, *Bell. Civ.* 1.48; Florus 2.6.14; Livy, *Per.* 76; Velleius Paterculus 2.21.1; Orosius, *Contra paganos* 5.18.18; ILLRP 1089-1102 (sling bullets)

110. Aeclanum (Italy), 88 B.C.

On Sulla's arrival before the town, the townsfolk try to play for time, hoping for help from their neighbours. However, Sulla has firewood piled around the walls and, when it is set ablaze, the town surrenders. The town is looted, because it had only surrendered when forced.

Sources: Appian, *Bell. Civ.* 1.51

111. Piraeus (Greece), 87-86 B.C. (cf. fig. 10)

Sulla launches a lightning attack on Archelaus, Mithridates' general in Piraeus. He assaults the 40-cubit (19 m) walls with ladders, but is repelled and withdraws to Eleusis and Megara to regroup. The town of Thebes supplies him with apparatus including catapults (*katapeltai*), and he constructs enormous machines using wood from the trees in the Academy. An embankment (*chōma*) is built using materials robbed from the Long Walls; Archelaus erects opposing towers equipped with engines (*organa*). He makes a nocturnal sortie and burns one of Sulla's sheds (*chelōnē*) and some equipment

(*mēchanēmata*), but the Romans build new ones in ten days. When Mithridates sends reinforcements by sea, Archelaus joins battle with Sulla, but his forces are driven back into the town. Sulla winters at Eleusis.

In 86, the Romans attempt an impromptu escalade using ladders brought up “through the nearby machines” (App., *Mithr.* 34), but are repulsed. Archelaus attempts to burn one of the two Roman towers without success, but counters it with a tower of his own. Sulla’s catapults damage Archelaus’ tower so badly that it has to be pulled back. Once the embankment is finally ready, Sulla advances his engines (*mēchanēmata*), but Archelaus has managed to undermine it, so that it suddenly sinks. While the embankment is repaired, a Roman force tunnels under the wall, where they meet the enemy tunnellers and skirmish.

Meanwhile, several machines (*mēchanēmata*) on the embankments (*chōmata*) pound the town wall until part falls down; the neighbouring tower is set on fire with fire arrows, and an escalade is attempted. Another section of wall is undermined and falls down when the wooden props are burned using sulphur, hemp and pitch. When Archelaus repairs the walls, the Romans renew the assault, thinking the repairs will be weak, but they are well protected, so Sulla halts the operation and goes to Athens (below, 112). When he returns, he brings up rams (*krioi*); a large force digs through the town wall under cover of sheds (*chelōnai*), and a newly repaired section is knocked down. Although he finds additional walls bolstering the damaged section, Sulla perseveres until Archelaus, dumbfounded by his persistence, withdraws by sea to Thessaly; the town is burned.

Sources: Appian, *Mithr.* 30-37, 40-41; Plutarch, *Sulla* 12.1-3, 14.7; Velleius Paterculus 2.23.3

112. Athens (Greece), 87-86 B.C. (cf. fig. 10)

Sulla detaches part of his army to besiege Aristion, Mithridates’ general in Athens, before proceeding to Piraeus (above, 111). By the winter, the city is suffering from starvation, so Archelaus attempts to send in supplies, which are twice intercepted by Sulla.

Sulla encircles the city with a ditch and associated forts (*phrouria*) to ensure that nobody escapes. Acting on information overheard, he launches an escalade at a poorly-guarded sector; the Athenians are too weak to repulse the Romans, and are slaughtered indiscriminately. A section of wall is levelled to allow the whole army in, and they run amok killing and gathering booty, but they are forbidden to burn the city.

Sources: Appian, *Mithr.* 30, 34-35, 38-39; Plutarch, *Sulla* 12.1, 13.1-14.7; Velleius Paterculus 2.23.3-5

113. Praeneste (Italy), 82 B.C.

Marius the Younger's defeated forces take refuge in Praeneste, which Sulla encircles with ditches and a wall, placing Q. Lucretius Afella in charge. Suffering from famine, after Sulla intercepts various relieving forces, Marius constructs a camp in no-man's land, from which he assaults Lucretius's circumvallation over several days, to no avail. Another relieving force is defeated and the heads of the generals are paraded around Praeneste. Finally, the townsfolk surrender in desperation. Marius takes refuge in a tunnel, but commits suicide, and his head is sent to Sulla. Sulla executes all of Marius's officers, slaughters the non-Roman townsfolk, and plunders the town.

Sources: Appian, *Bell. Civ.* 1.87-88, 90, 93-94; Plutarch, *Sulla* 29.1, 29.8, 32.1; Velleius Paterculus 2.26.1, 4-6; Valerius Maximus 6.8.2

114. Langobriga (Spain), 79 B.C.

Q. Caecilius Metellus Pius cuts off the water supply to the town, which is allied to the renegade, Sertorius. The over-confident Metellus's troops have provisions for only five days, but Sertorius acquires two thousand water-skins, promising a reward for every one safely delivered into the town, and orders that the non-combatants should be smuggled out by the same secret route. When Metellus sends a large body of troops out foraging, Sertorius ambushes and defeats them. Metellus withdraws from the town.

Sources: Plutarch, *Sertorius* 13.4-6

115. Isaura Vetus (Turkey), 75 B.C.

While P. Servilius Vatia is besieging the town, the townsfolk mount a nocturnal sortie, mistakenly assuming the Roman fortification (*munitio*) to have been abandoned; the attack is repulsed and “the ditches are half filled with the bodies of the slain”. Servilius subsequently diverts the nearby river, denying the town its water supply. The inhabitants duly surrender and are sold into slavery; the town is destroyed.

The neighbouring town of Isaura Nova promptly seeks terms for peace, and hands over a hundred hostages, plus weapons and artillery (*tormenta*).

Sources: Sallust, *Hist.* 2 frg. 87 (Maurenbrecher); Frontinus, *Strat.* 3.7.1; AE 1977, 816

116. Themyscira (Turkey), 72 B.C.

L. Licinius Lucullus besieges Mithridates’ garrison with embankments (*chōmata*), towers (*purgoi*), and tunnels “which were so large that, in them, a multitude could attack one another under the ground” (App., *Mithr.* 78). The defenders break into the tunnels from above and insert bears and other wild animals, and swarms of bees, to repel the sappers. The siege appears to have been abandoned.

Sources: Appian, *Mithr.* 78; Plutarch, *Lucullus* 14.2

117. Heraclea Pontica (Turkey), 72-71 B.C.

M. Aurelius Cotta makes an initial assault on the town, but when he suffers large casualties he encamps and prepares for a siege. He targets a tower with a shed (*chelōnē*) and a battering-ram (*krios*), but the ram is destroyed; in frustration, he burns the machinery (*mēchanēma*) and beheads the engineers (*mēchanopoioi*). Resorting to blockade, the fleet of his colleague, C. Valerius Triarius, closes off the harbour, causing famine and plague in the town. Eventually, the garrison commander, Connacorex, escapes by sea, betraying the town to Triarius. The Romans pour in through the gates and over the walls, slaughtering the townsfolk and looting valuables and furniture. The town is destroyed.

Sources: Memnon 47-52 (Jacoby, *Frag. Griech. Hist.*, no. 434)

118. Amisus (Turkey), 72-71 B.C.

Lucullus embarks on a leisurely siege of the town, and entrusts command to L. Licinius Murena while he pursues Mithridates in search of a decisive battle. The siege is protracted because the garrison commander, Callimachus, is experienced with machinery (*mēchanikos*). However, Murena storms the walls when the watch is being changed, and Callimachus abandons the town after setting fire to it. Lucullus endeavours to extinguish the conflagration, but his soldiers are more intent on looting and, by morning, the town has been destroyed.

Sources: Appian, *Mithr.* 78, 83; Plutarch, *Lucullus* 14.3, 15.1, 19.2-6

119. Sinope (Turkey), 70 B.C.

Lucullus besieges the town, which is held by a Cilician garrison under the command of the pirate Seleucus, acting for Mithridates. The garrison set fire to the place, burn their heavier ships, and proceed to escape in the lighter ones. Lucullus manages to kill many before they can depart, and restores the town to the Sinopians.

Sources: Appian, *Mithr.* 83; Plutarch, *Lucullus* 23.2-3; Orosius, *Contra paganos* 6.3.2

120. Tigranocerta (Turkey), 69 B.C.

Lucullus entrusts the siege of King Tigranes' general, Mancaeus, to a certain Sextilius, who encircles the city with a ditch, brings up equipment (*mēchanai*), and begins to undermine the wall. The defenders pour naphtha on the machinery to burn it. Following Tigranes' defeat in battle by Lucullus, Mancaeus's disaffected Greek mercenaries admit the Romans into the city, which they duly plunder.

Sources: Appian, *Mithr.* 84, 86; Plutarch, *Lucullus* 26.1-2; 29.2-3; Dio/Xiphilinus 36.1b.1-3

121. Nisibis (Turkey), 68 B.C.

Lucullus arrives in high summer before the town, where Tigranes has left his brother, Gouras, and the engineer, Callimachus, in charge of his treasury. Lucullus can make no headway against the town, with its thick, double walls and intervening ditch. By winter,

the garrison has grown careless and, on a moonless, stormy night, evacuate the outer defences; Lucullus immediately mounts an assault, using previously erected embankments (*chōmata*) to ascend the outer wall. Killing the few remaining guards, his men fill in the intermediate ditch and easily capture the inner wall. Some of the defenders flee to the citadel, but later surrender. Gouras is treated with clemency, but Callimachus is imprisoned for having destroyed Amisus (above, 118). Lucullus captures the treasury and overwinters in the city.

Sources: Cassius Dio 36.6.2-7.4; Plutarch, *Lucullus* 32.4

122. Jerusalem (Israel), 63 B.C. (cf. fig. 22)

Aristobulus II of Judaea reneges on his treaty with Cn. Pompeius Magnus (Pompey), refusing to pay the agreed tribute to his general, Gabinius, so Pompey arrests Aristobulus and marches on Jerusalem. The followers of his brother, Hyrcanus, admit Pompey and his army, while Aristobulus's followers withdraw to the Temple and prepare to stand siege. Pompey tries to negotiate but is rebuffed, so he encamps on the north side of the Temple, where it is protected by a deep ditch (60 feet deep and 260 feet wide, according to Strabo, 16.2.40); he may also have established a second camp to the south-west of the city (cf. Jos., *Bell. Jud.* 5.506). The Jews fail to stop the Romans filling the ditch with an embankment (*chōma*) of timber felled in the neighbourhood. Towers (*purgoi*) are erected on it, and machines (*mēchanai*) brought from Tyre breach the wall, while stone-projectors (*petroboloi*) repulse those trying to obstruct the work from above. After three months, the Romans throw down one of the towers, and two centurions lead the assault into the Temple. It is the Sabbath and the Jews offer no resistance to the Roman slaughter. Pompey takes no plunder and leaves the Temple intact (though Dio alleges that looting took place).

Sources: Josephus, *Ant. Jud.* 14.55-76; *Bell. Jud.* 1.141-154; Cassius Dio 27.16

123. Solonium (France), 61 B.C.

L. Marius and Ser. Galba encamp and set fire to parts of the town, but are prevented from capturing it by the arrival of a relieving force under the command of Catagnatus.

The governor of Gallia Narbonensis, C. Pomptinus, sends reinforcements and captures the town.

Sources: Cassius Dio 37.48.2; Livy, *Per.* 103

124. Noviodunum (France), 57 B.C.

C. Julius Caesar endeavours to storm the town, but is thwarted by the breadth of the ditch and the height of the walls, so he encamps and brings up shelters (*vineae*), builds an embankment (*agger*), and constructs towers (*turres*). The townsfolk are overawed by the scale of the siege-works and the speed of their construction, and immediately surrender. Caesar takes hostages and disarms the townsfolk.

Sources: Caesar, *Bell. Gall.* 2.12-13

125. Strongholds of the Veneti (France), 56 B.C.

Caesar's assault on the maritime Veneti is complicated by the location of their *oppida* on promontories, which are only accessible by land at low tide. Accordingly, at each *oppidum*, Caesar builds an embankment (*agger ac moles*) to keep back the water and allow access up to the walls. But, in every case, the townsfolk are immediately evacuated by ship. In frustration, Caesar halts the land-based operations; the Veneti are later defeated at sea by the Roman fleet.

Sources: Caesar, *Bell. Gall.* 3.12

126. Town of the Atuatuca (Belgium), 57 B.C.

Caesar constructs a 3-mile (4½ km) palisade (*vallum*), with closely-spaced forts (*castella*), around the town, then brings up shelters (*vineae*) and constructs an embankment (*agger*). The townsfolk's amusement on seeing a tower (*turris*) constructed in the distance turns to dismay when they see the machine (*machinatio*) approaching the walls. They immediately sue for peace, but beg not to be disarmed. Caesar agrees to spare them if they surrender before his battering-ram (*aries*) touches the wall, but insists on disarmament. Although the townsfolk agree, they mount a night-time attack on the

Roman lines, and are defeated. Next day, Caesar breaks down the town gates, the town is occupied and the townsfolk are sold.

Sources: Caesar, *Bell. Gall.* 2.30-33

127. Alexandrion (Israel), 57 B.C.

The pretender, Alexander, the son of Aristobulus, causes trouble for the Roman client king of Judeaea, Hyrcanus, and is defeated in battle by Gabinius, the governor of Syria, and his deputy, M. Antonius (Mark Antony). Alexander flees to the fortress of Alexandrion, and Gabinius tries to negotiate but is rebuffed and besieges the place so vigorously that Alexander surrenders; Gabinius demolishes the fortress.

Sources: Josephus, *Ant. Jud.* 14.82-90; *Bell. Jud.* 1.160-168

128. Town of the Sotiates (France), 56 B.C.

Having defeated the Sotiates in battle, P. Licinius Crassus assaults their town, bringing up shelters (*vineae*) and constructing an embankment (*agger*) for his towers (*turres*). The townsfolk mount a sortie, and then attempt to undermine the embankment, but fail, and sue for peace. When Crassus demands their disarmament, their chieftain, Adiatunnus, leads a desperate attack but is driven back into the town. Crassus takes hostages and disarms the townsfolk. The whole operation takes a few days.

Sources: Caesar, *Bell. Gall.* 3.21-22

129. Zenodotium (?Turkey), 54 B.C.

While M. Licinius Crassus's troops are occupying friendly towns in Mesopotamia, the townsfolk of Zenodotium kill a hundred Romans (treachery is implied), so Crassus assaults the town, plunders its wealth and sells the townsfolk into slavery.

Sources: Plutarch, *Crassus* 17.5-6

130. Vellaunodunum (France), 52 B.C.

Caesar surrounds the town (*circumvallare*) in two days. On the third day, the townsfolk sue for peace, so Caesar takes hostages and pack animals, and disarms the townsfolk.

Sources: Caesar, *Bell. Gall.* 7.11

131. Cenabum (France), 52 B.C.

Caesar encamps before the town, where some Roman traders have lately been murdered, and troops are detailed to watch the town overnight. The townsfolk attempt a nocturnal escape, but the troops on watch intercept them, set fire to the town gates, and enter the town. Caesar gives them free rein to plunder and burn the town.

Sources: Caesar, *Bell. Gall.* 7.11

132. Avaricum (France), 52 B.C. (cf. fig. 11)

Caesar encamps on the narrow approach through the surrounding marshes; as the location will not permit a circumvallation, he begins construction of an embankment (*agger*), moves up shelters (*vineae*), and builds two towers (*turres*). The defenders attempt to undermine the embankment and mount sorties to set fire to it and disrupt the siege operations (*opera*). The defenders build hide-covered turrets, which they increment in height to match the Roman towers, rising daily with the heightening of the embankment; they prevent the "open tunnels" (*aperti cuniculi*; cf. p. 192) from reaching the walls by using fire-hardened, sharpened timbers, boiling-hot pitch and very heavy stones. Despite poor weather, after 25 days, the embankment, 330 feet (97.6m) wide and 80 feet (23.6m) high, has almost reached the town wall. Some of the defenders tunnel underneath and start a fire, while others on the wall throw firebrands and pitch, and still others mount sorties on both sides of the Roman towers. The towers are dragged back, the embankment is cut off, and troops rush to extinguish the fire and repel the sorties, but the screens (*plutei*) for the towers are burnt, preventing the Romans from easily giving assistance. A Gaul, throwing burning lumps of grease and pitch at one of the towers, is shot by a *scorpio*, as is his companion, when he takes up the task, and so on, until the situation is brought under Roman control.

The townsfolk abandon plans to escape, fearing that the Roman cavalry will intercept them. On the following day, the works (*opera*) being complete, Caesar brings up a tower. The troops are mustered within the shelters (*vineae*) and, under cover of a heavy

downpour, suddenly launch an assault, forcing the defenders back off the wall and turrets and occupying the wall-walk. The defenders are slaughtered as they flee. Caesar appropriates the supplies laid up in the town.

Sources: Caesar, *Bell. Gall.* 7.17, 22, 24-28, 32

133. Gergovia (France), 52 B.C. (cf. fig. 12)

Caesar reconnoitres Vercingetorix's hill-top refuge. Deciding that it cannot be taken by storm (*expugnatio*), he encamps about 2½ km south-east of the town, at the end of a ridge, and captures a Gallic outpost, farther west, on the summit of a small hill; he links the two with twin ditches, 12 feet (3.6m) wide, in order to safeguard movements to and fro, and simultaneously deny the townsfolk access to the river in the valley below.

Caesar then decides upon a surprise assault: while his Gallic allies create a diversion, he secretly transfers troops from the main camp across to the small camp, and thence onto the ridge to the west of the main town gate. However, some of the troops are over-enthusiastic; one centurion, L. Fabius, is lifted up onto the wall by three of his comrades, whom he then pulls up beside him. Vercingetorix throws fresh Gallic troops into the mêlée, and catches the Romans on disadvantageous terrain. Fabius and his comrades are cut down and thrown from the walls; another centurion, M. Petronius, fails to hack the gate open, and falls while ensuring the safe withdrawal of his men. In total, sixty-four centurions are killed. Caesar reprimands his troops in a parade on the following day, and withdraws from Gergovia.

Sources: Caesar, *Bell. Gall.* 7.36, 41, 44-53

134. Alesia (France), 52 B.C. (cf. fig. 13)

Caesar encamps before the town, which lies on a hill between two rivers. He begins an 11-mile (16¼ km) fortification (*munitio*), with camps (*castra*) and twenty-three forts (*castella*) for pickets (*stationes*). Vercingetorix evacuates all his cavalry before the investment is completed. The siege-works (*munitiones*) comprise a 20-foot (6 m) square-section ditch; 400 feet (118 m) of dead ground; double 15-foot (4.5 m) ditches, the inner of which is filled with water from the diverted river; and a palisaded rampart

(*agger ac vallum*), 12 feet (3.5 m) high, with breastwork and battlements and a *chevaux de frise* (*cervi*) at the junction of the wicker screens (*plutei*) with the rampart, and turrets every 80 feet (23.6 m). Caesar comments that the circuit is too long for a cordon of troops (*corona*). To counter the frequent sorties from the town, Caesar arranges a line of 'grave stones' (*cippi*) – tree trunks, fixed in trenches 5 feet (1.5m) deep, with the projecting branches sharpened and entangled – then eight rows of 'lilies' (*lilia*) – thick, fire-hardened stakes, concealed beneath brushwood in pits 3 feet (0.9m) deep, and arranged in a quincunx pattern – and, in front of them, 'spurs' (*stimuli*) – foot-long (0.3 m) logs, sunk into the ground and tipped with a barbed iron point. Broadly the same arrangements are duplicated facing outwards on a 14-mile (21 km) circuit.

The Gauls try to send away the old and infirm, but Caesar does not allow them through the siege-lines. A relieving force arrives, but is defeated by the Roman cavalry. The defenders, having issued from the town and crossed the first ditch by covering it with wicker and earth, withdraw again. The relieving force then prepare wicker panels (*crates*), ladders (*scalae*) and hooks (*harpagones*) and attack the outer line by night, but are beaten back. The defenders simultaneously launch a sortie against the inner line, but fall foul of the traps and are picked off by artillery (*tormenta*) and *pila muralia*. The Romans are forced to fight on several fronts when part of the Gallic relieving force seizes a hill overlooking one of the Roman camps, another part feints at the siege-works, and the townsfolk assault the circumvallation with wicker panels, poles, galleries (*musculi*) and hooks (*falces*). After bitter fighting, the relieving force is utterly defeated and the townsfolk repulsed. Vercingetorix surrenders and disarms; the townsfolk are taken into slavery.

Sources: Caesar, *Bell. Gall.* 7.69-74, 78-89; Cassius Dio 40.39.3-40.6

Archaeological evidence discussed on pp. 104-111, above.

135. Uxellodunum (France), 51 B.C. (cf. fig. 15)

The Gallic rebels, Drappes and Lucterius, take refuge in the hill-town, which C. Caninius Rebilus surrounds with three camps (*castra*) and an unspecified number of forts (*castella*). He begins construction of an encircling palisade (*vallum*). Fearing a

blockade, Drappes and Lucterius slip out of the town to organize supplies of corn. Their forces mount nocturnal assaults on Caninius's forts, so he halts construction of the circumvallation (*munitiones*), in case it proves too long to defend effectively and thus weakens each of his guard posts (*praesidia*). The corn supplies are intercepted *en route* to the town, Lucterius flees, Drappes is captured, and Caninius completes his siege-works (*opera*). Caesar arrives and prevents the townsfolk accessing the river, which flows along the valley below the town, by posting archers, slingers, and artillery (*tormenta*) to cover the access route. However, at the base of the town wall on the other side, there is a fresh water spring. Caesar builds up a 60-foot (17.7 m) embankment (*agger*) at this spot, under cover of shelters (*vineae*), and erects a ten-storey tower (*turris*) from which artillery-fire can target the spring. In panic, the townsfolk attack the embankment by rolling burning barrels of tallow and pitch down the hill, and try to distract the Romans from extinguishing the flames. Meanwhile, the Romans have been driving "covered tunnels" (*cuniculi tecti*) up to the head of the spring, without the townsfolk realizing, and divert the water away. Already suffering from thirst, they surrender in despair. Caesar makes an example of them by cutting off the hands of all who had borne arms.

Sources: Hirtius, *Bell. Gall.* 8.33-37, 40-44; Orosius, *Contra paganos* 6.11.20-29

136. Pindenissus (Turkey), 51 B.C.

M. Tullius Cicero encircles the mountain-top town with a palisade and ditch (*vallum et fossa*) and constructs six forts (*castella*) and some large camps (*castra maxima*). He begins construction of embankments (*aggeres*), and deploys shelters (*vineae*), a tower (*turris altissima*) and much artillery (*magna tormentorum copia*), besides his force of archers. The town surrenders on the fifty-seventh day and is burnt.

Sources: Cicero, *Ad Fam.* 2.10.3, 15.4.10; *Ad Att.* 5.20

137. Corfinium (Italy), 49 B.C.

Caesar encamps before the town, whereupon L. Domitius Ahenobarbus positions artillery (*tormenta*) on the walls. Caesar's reinforcements arrive three days later, and

encamp on the other side of the town. He begins to surround the town with a rampart and forts (*vallum castellaque*). When Domitius plans his own escape, his soldiers betray him to Caesar; as it is night, Caesar does not immediately enter the town, fearing that his troops would be tempted to plunder under cover of darkness, but stations troops along the siege-works (*opera*) in an unbroken cordon to prevent anyone escaping. Next day, Domitius's troops take an oath of loyalty to Caesar, and the siege is raised. The whole operation has taken seven days.

Sources: Caesar, *Bell. Civ.* 1.16, 18, 20-23; Appian, *Bell. Civ.* 2.38; Cassius Dio 41.10.2, 11.1-3

138. Brundisium (Italy), 49 B.C.

Caesar blocks the harbour entrance, to dissuade Pompey from using the town as a naval base. He extends embankments from each shore, continuing them in the deeper water as a double line of 30-foot (8.9 m) pontoons, anchored in place, covered with earth and defended by wicker screens (*crates ac plutei*), with a two-storey turret on every fourth pontoon. Pompey attempts to ram the pontoons with cargo ships equipped with three-storey artillery turrets. Caesar tries to negotiate but is rebuffed. Pompey then makes preparations to sail for Dyrrachium; in case Caesar's troops enter the town to stop him, he blocks the town gates and open plazas, digs ditches across the streets, and creates hidden traps – sharpened stakes in pits covered with wicker panels (*crates*) and earth. After nine days, Pompey's ships arrive to ferry his troops across to Dyrrachium; the townsfolk, disgruntled at his treatment of them, alert Caesar, who mounts an escalade just as Pompey's troops are embarking. Two ships are captured when they run afoul of Caesar's harbour blockade.

Sources: Caesar, *Bell. Civ.* 1.25-28; Appian, *Bell. Civ.* 2.40; Cassius Dio 41.12.1-3

139. Massilia (France), 49 B.C. (cf. fig. 16)

Pompey puts the maritime town on a war footing, closing the gates against Caesar, laying in supplies, repairing defences, and setting up armament workshops. Caesar deploys towers and shelters (*turres vineasque*) and places C. Trebonius in charge.

Trebonius begins construction of two embankments (*aggeres*) at different points, brings up shelters and towers (*vineae turresque*), mobilizes a multitude of men and pack-animals, and requisitions osiers and timber. (Lucan misrepresents one of the two *aggeres* as a rampart connecting the Roman camp to the sea: *Bell. Civ.* 3.383-387.) One embankment (*agger*) is raised to a height of 80 feet (23.6m), and there is apparently an attempt to tunnel into the town (Vitr., *De arch.* 10.16.11).

The shelters (*vineae*) do not provide adequate protection against the town's formidable artillery (*tormenta*); in particular, 12-foot (3.5 m) iron-pointed stakes fired from the largest *ballistae* crash through four layers of wicker panels (*crates*) before sticking in the ground. Accordingly, Trebonius constructs galleries (*porticūs*) with foot-thick (0.30 m) timbers to protect the workers as they pass material forward from hand to hand for the embankment. To level the ground in front, he deploys a 60-foot (18 m) shed (*testudo*), covered with all sorts of materials to protect against fire and stones. The operation is protracted by the strength of the defences, the quantity of Massiliot artillery, and the frequency of their sorties. Consequently, under cover of screens and shelters (*plutei ac vineae*), the Romans plant a brick refuge (*castellum ac receptaculum*) near the town wall, 30 feet (8.9m) square, with walls 5 feet (1.5m) thick, and later build it up as a six-storey tower. Then, a 60-foot (17.7 m) long gallery (*musculus*) is rolled into place, leading from the Roman tower right up to a tower on the town wall, which the Romans begin to undermine. The Massiliots tip blocks of masonry and blazing barrels of pitch onto the roof of the gallery, which easily deflects them. The Romans drive the defenders away with artillery-fire from the brick tower, enabling the successful undermining of the tower on the town wall, whereupon the town surrenders.

Caesar has forbidden Trebonius to allow the soldiers into the town, to prevent indiscriminate slaughter, so the siege is suspended, awaiting his arrival. However, after a few days, the Massiliots set fire to the siege-works (*opera*), destroying the embankment, screens, shed, tower, artillery, and the gallery and brick tower (*agger, plutei, testudo, turris, tormenta ... musculus turrisque*). The other embankment and tower are attacked on the following day.

Trebonius builds a new type of embankment (*agger*), because the neighbourhood has been stripped of timber: two 6-foot (1.8 m) thick brick walls are bridged with timbers, supported beneath by uprights and cross-beams, and covered with wicker panels (*crates*) and clay; the Romans work safely inside the structure, protected in front by screens (*plutei*). It is completed within a few days, whereupon the Massiliots surrender.

Sources: Caesar, *Bell. Civ.* 1.34, 36, 2.1-2, 8-16, 22; Lucan, *Bell. Civ.* 3.375-398, 453-508; Vitruvius, *De Architectura* 10.16.11-12

140. Utica (Tunisia), 49 B.C.

Caesar's general, C. Scribonius Curio, occupies the site of the *castra Corneliana* (see 64, above), but the water supply is poisoned and his men fall ill, so he encamps outside the town. After a skirmish, Curio surrounds the town with a palisade (*vallum*), whereupon the townsfolk consider surrendering. However, hearing of the approach of a relieving force, Curio abandons the siege and retreats to the *castra Corneliana*.

Sources: Caesar, *Bell. Civ.* 2.24, 26, 33-37; Appian, *Bell. Civ.* 2.44-46; Cassius Dio 41.41.4

141. Saloniae (Croatia), 48 B.C.

Pompey's general, M. Octavius, tries to negotiate with the pro-Caesarians in the coastal town but is rebuffed, so he mounts an assault. The defenders raise timber towers on the wall circuit, free the adult slaves, and collect their womenfolk's hair for catapult springs.

Octavius surrounds the town with five camps (*castra*) and tries a combination of blockade (*obsidio*) and assault (*oppugnatio*). When the town's supplies begin to fail, and boredom makes the besiegers careless, the townsfolk mount an assault on one of Octavius's camps and, routing the besiegers, continue to the second, and the third, and so on. Octavius's men flee to their ships and the siege is raised.

Sources: Caesar, *Bell. Civ.* 3.9

142. Oricum (Albania), 48 B.C.

Pompey's son, Cn. Pompeius, attacks the pro-Caesarian town, protected by water on three sides. Caesar's general, M. Acilius Caninianus, secures his warships in the inner harbour by sinking a merchantman in the entrance and fastening another one to it.

Pompey attacks the town by land-based escalade and from shipboard, gaining access to the harbour by dragging away the sunken ship using a winch (*remulcum*) and overpowering the other ship. He tows away four of Acilius's warships and burns the rest; the town is captured.

Sources: Caesar, *Bell. Civ.* 3.39-40; Appian, *Bell. Civ.* 2.56

143. Dyrrachium (Albania), 48 B.C. (cf. fig. 17)

Caesar plants forts (*castella*) along a line of hilltops enclosing Pompey's camp, to separate him from his supply base at Dyrrachium, but Pompey immediately seizes as large an area as possible, by establishing his own ring of twenty-four forts, marking out a circuit of 15 miles (22 km). Caesar begins to connect his forts with a continuous 17-mile (25 km) fortification (*perpetuae munitiones*), and Pompey does likewise, deploying archers and slingers against Caesar's work gangs, and in one area bringing up artillery (*tormenta*) as well. There are frequent running battles, and finally, Pompey launches a concerted attempt to break through the blockade at the southern end, where Caesar has supplemented the inward-facing fifteen-foot (4.4 m) ditch and ten-foot (3 m) rampart with an outward-facing fortification, 600 feet (*ca.* 175 m) away, but has not yet closed the lines off to the sea. Accordingly, a dawn attack on the inner line – the ditches are filled in and ladders brought up to facilitate an escalade – is coordinated with an amphibious attack on the outer line and the space between. Caesar's forces are routed, and he abandons the siege, with an army apparently suffering from famine and disease.

Sources: Caesar, *Bell. Civ.* 3.41, 43-45, 49-55, 62-73; Appian, *Bell. Civ.* 2.60-63; Cassius Dio 41.50.3; Plutarch, *Caesar* 39; *Pompey* 65; Valerius Maximus 3.2.23; Velleius Paterculus 2.51.1-2; Florus 2.13

144. Gomphi (Greece), 48 B.C.

The townsfolk bar their gates against Caesar, so he encamps before the town and orders ladders and galleries (*scalae musculique*) and wicker panels (*crates*) to be prepared. He launches an assault in mid-afternoon and captures the town before nightfall. The town is turned over to the soldiers to plunder, as a punishment for shutting him out.

Sources: Caesar, *Bell. Civ.* 3.80; Appian, *Bell. Civ.* 2.64; Plutarch, *Caesar* 41

145. Pharos, Alexandria (Egypt), 48 B.C. (cf. fig. 18)

Caesar is confined to the palace quarter by the Egyptians, so he fortifies his position, creating a “no-man’s land” by demolishing peripheral buildings with battering-rams, reinforcing poorly defended sectors with sheds and galleries (*testudines ac musculi*), and shutting off an area of marsh to the south with shelters (*vineae*). Both sides are equipped with artillery (*tormenta*). The Egyptians set up workshops, erecting 40-foot (12 m) masonry barriers and building ten-storey wheeled towers (*turres ambulatoriae*), powered by draft animals. Meanwhile, a number of naval engagements are fought, with the Romans prevailing. Caesar then makes an opposed landing on the Pharos island, and, although without ladders or wicker panels (*crates*) his troops cannot scale the 30-foot (8.8 m) fortifications, the defenders flee. Caesar gives his troops free rein to plunder, builds a fort (*castellum*), and seizes the Heptastadium causeway, linking the island to the mainland. However, the over-confidence of the marines loses the causeway and the fort to the Egyptians. Roman reinforcements arrive and the issue is resolved in a pitched battle.

Sources: Caesar, *Bell. Civ.* 3.111-112; *Bell. Alex.* 1-22; Appian, *Bell. Civ.* 2.90; Plutarch, *Caesar* 49

146. Ulia (Spain), 47 B.C.

Caesar’s general in Spain, Q. Cassius Longinus, encamps outside Ulia, but is himself besieged by M. Claudius Marcellus Aeserninus, who builds forts (*castella*) around the town and encloses both Cassius and Ulia with siege-works (*opera*). Before the ring is complete, Cassius sends away his cavalry. A relieving force under Bogus of Mauretania

arrives at Marcellus's outer fortifications (*exteriores munitiones*) but, despite fierce skirmishing, cannot dislodge him. The governor, M. Aemilius Lepidus, arrives to settle the quarrel, and Marcellus submits to his authority, but Cassius demands that the siege-works (*munitiones*) be dismantled first. Work is under way, when Bogus attacks one of Marcellus's forts, and Lepidus is obliged to intervene; all parties then disperse.

Sources: *Bell. Alex.* 61-63

147. Thapsus (Tunisia), 46 B.C. (cf. fig. 19)

Caesar encamps near the town held by the Pompeian, C. Vergilius, and begins to encircle (*circummunire*) the coastal headland with a crescent of siege-works (*opera*), establishing guard posts (*praesidia*) at strategic points. He plants a fort (*castellum*) between the coast and the nearby salt lake, blocking the narrow approach to the town from the south.

The Pompeian, Q. Caecilius Scipio, approaching from the south, is obliged to skirt around the salt lake and encamp 1½ miles (2¼ km) to the north. While he is still entrenching, Caesar defeats him in battle; a sortie from the town is repulsed.

Next day, Caesar parades his troops and leaves C. Caninius Rebilus to prosecute the siege. Following Caesar's victory two months later, a fine is imposed on the town and plundering is forbidden.

Sources: *Bell. Afr.* 79-80, 86, 97; Cassius Dio 43.7.1-9.1

148. Ulia (Spain), 45 B.C.

Caesar sends L. Vibius Paciaecus to the aid of Ulia, which Cn. Pompeius has been besieging for several months, during which time a tower on the town wall collapses with the weight of the overcrowded defenders. The Caesarian forces arrive in the midst of a storm, and easily pass through Pompeius's pickets (*praesidia*) unseen. Meanwhile, Caesar's feint at Corduba forces Pompeius to raise the siege.

Sources: *Bell. Hisp.* 3-4; Cassius Dio 43.31.4-32.6

149. Ategua (Spain), 45 B.C.

Caesar encircles the pro-Pompeian town with earthworks (*bracchia circumducere*; Dio mentions a palisade, *staurōmata*) and establishes several forts (*castella*) to protect his camp (*castra*). Then he builds an embankment (*agger*) and brings up shelters (*vineae*). The town defenders make a nightly attempt on the siege-works, throwing fire and missiles from the walls, but a sling bullet bearing the offer of surrender fires the Caesarians' enthusiasm. Next day, a siegework (*opus*) is constructed at the wall, a large section of which is knocked down (Dio attributes this to a mine). There is renewed fighting and Caesar throws a cordon (*corona*) around the town. A *ballista* knocks down a (wooden) tower, with the five men and the look-out boy who are manning it. At some point, the Ateguans take hostages and execute them on the town battlements. A nocturnal sortie, with brushwood and wicker panels (*crates*) for crossing the ditch, hooks (*harpagones*) to pull apart the soldiers' thatched huts, and silverware to distract the more acquisitive soldiers, is repulsed with much slaughter. In further skirmishing, one of Caesar's towers (*turris lignea*) is set alight and damaged up to the third storey, but the townsfolk lose heart on account of Pompeius's inaction. Their offer of surrender is accepted and the town is taken.

Sources: *Bell. Hisp.* 6-19; Cassius Dio 43.33.2-34.5

Archaeological evidence discussed on pp. 111f., above.

150. Mutina (Italy), 44-43 B.C.

Late in 44 B.C., D. Iunius Brutus Albinus (Decimus Brutus) prepares to stand siege against M. Antonius (Mark Antony), and lays in stores of salted meat in preparation; Antony encircles the town with ditches and walls. Early next year, the townsfolk begin to suffer from famine, and the Senate instructs Antony to raise the siege. In April, Antony's army checks a relieving force under Octavian and C. Vibius Pansa at nearby Forum Gallorum, but is itself worsted by A. Hirtius, encamped near the town. Still hoping to reduce the town by starvation, Antony tries to avoid battle, but is badly mauled in another encounter with Octavian and Hirtius. Fearing that Octavian will encircle his army, Antony raises the siege and withdraws.

Sources: Appian, *Bell. Civ.* 3.49, 61, 65, 70-72; Cicero, *Ad Fam.* 10.30.1-5, 33.4;
Phil. 6

151. Smyrna (Turkey), 43 B.C.

The conspirator, C. Trebonius, refuses P. Cornelius Dolabella entry into Smyrna, so the latter pretends to depart, but returns by night with ladders and, finding the walls unmanned, takes the town by escalade. Trebonius is executed by a centurion, and his body and head are separately treated in a degrading fashion.

Sources: Appian, *Bell. Civ.* 3.26

152. Laodicea (Syria), 43 B.C.

The renegade, P. Cornelius Dolabella, takes refuge from C. Cassius Longinus (Cassius) in Laodicea, a town located on a peninsula. Cassius blocks the peninsula with a 2-stade (370 m) stone wall, built of material scavenged from the suburbs, and defeats Dolabella at sea. On land, an embankment (*chōma*) is raised, and an attempt is made to break down the wall. Cassius fails in his attempts to suborn Dolabella's night watch, but persuades some centurions to open some posterns by day, and captures the town. Dolabella commits suicide, the town is plundered and the leading citizens punished.

Sources: Appian, *Bell. Civ.* 4.60-62; Cassius Dio 47.30.3-7

153. Rhodes (Greece), 42 B.C.

Having defeated the Rhodian navy at Myndos, Cassius lands troops on the island and surrounds the town by land and sea. They repulse the land-based assaults of C. Fannius, while Cassius leads an attack on the sea walls, utilizing collapsible turrets on shipboard. The townsfolk fear starvation, and open discussions with Fannius, but Cassius is admitted by partisans within the town and captures Rhodes without the use of force. Cassius forbids his troops to sack the town, but appropriates the contents of all the public treasuries, and orders the townsfolk to surrender their wealth. Fifty of the leading citizens are executed and a garrison installed

Sources: Appian, *Bell. Civ.* 4.72-73

154. Xanthus (Turkey), 42 B.C.

On the approach of M. Iunius Brutus, the townsfolk dig a fifty-foot (15.4 m) ditch around the town, having destroyed all the buildings beyond, to deny their use to the enemy. Some of the townsfolk attempt to escape by swimming along the river but are caught in nets. Working day and night, the Romans fill in the ditch in a few days, with protection (*skepastēria*) from Xanthian missile fire. They proceed to attack the gates and bring up machines (*mēchanēmata*) against the wall, but when the wall is breached Brutus calls off the attack. A nocturnal sortie to set fire to the machinery (*mēchanai*) is repulsed and, when the gates are closed prematurely, the Xanthians are slaughtered outside. Another sortie, this time by daylight, succeeds in burning ladders (*klimakes*) and towers (*purgoi*). Some Romans manage to rush into the town before the gates are closed; trapped in the town and pelted from the roof-tops, they take refuge in a shrine near the walls. Unable to break through the gates, a party cross the walls using tree-trunks and ropes, and open the main gates from the inside to admit Brutus's forces. In panic, the Xanthians begin killing their families and, rejecting Brutus's offer of a truce, burn their possessions on bonfires. (Plutarch alleges that the town walls were accidentally set on fire by sparks from the burning Roman machinery, but that the townsfolk then encouraged the conflagration.) Fewer than 150 men survive to be taken prisoner.

Sources: Appian, *Bell. Civ.* 4.76-80; Plutarch, *Brutus* 30.4-31.5

155. Perugia (Italy), 41-40 B.C.

Late in the year, Octavian, M. Agrippa and Q. Salvidienus Rufus surround the town and, with it, L. Antonius, encamped outside. Octavian encircles the town with a 15-foot (4.6 m) ditch and rampart 56 stades (10¼ km) long, and closes off access to the nearby Tiber, while Antonius constructs a rampart and ditch at the base of the town hill. Relieving forces under C. Asinius Pollio and P. Ventidius are headed off, and seek refuge in nearby towns. Meanwhile, Octavian doubles the size of the surrounding ditch, augmented by sharpened stakes, and heightens the wall, adding 1,500 towers at 60-foot (18.5 m) intervals; he also constructs defences facing outwards. Antonius begins to succumb to famine and forbids food to be given to slaves. Despairing of relief, he mounts a

desperate dawn assault, with iron tools for wall-fighting (*sidēroi teichomachoi*), ladders (*klimakes*), contrivances (*organa*) for filling up the ditches, collapsible towers (*purgoi ptuktoi*) with drawbridges (*sanides*), and wicker panels (*gerra*) to cover the sharpened stakes. Filling in the ditch, and crossing the stakes, his troops assault the rampart with the ladders and towers, under cover of stones, arrows and slingshot. Many gain the rampart top on drawbridges, but Octavian throws fresh troops into the battle, and Antonius's men are repulsed and their machinery (*mēchanēmata*) smashed, whereupon they retreat. Finally, Antonius surrenders; his troops are received into Octavian's army, the town council is executed, and the town, which was to have been plundered, is burned down when a certain Macedonicus sets fire to his house and commits suicide.

Sources: Appian, *Bell. Civ.* 5.32-38, 46-49; Velleius Paterculus 2.74.3-4; ILLRP 1106-1118 (sling bullets)

156. Brundisium (Italy), 40 B.C.

Mark Antony and his ally, L. Domitius Ahenobarbus, are denied entry, so they cut off the town with a ditch and palisade across the isthmus, and build a line of towers around the harbour. Octavian's relieving force encamps outside these fortifications, whereupon Antony begins construction of machinery (*mēchanēmata*) for an assault on the town. However, he procrastinates when he learns that further relief is *en route*, and that his own allies are faring badly elsewhere; the two armies begin to fraternise, and Antony is eventually reconciled with Octavian.

Sources: Appian, *Bell. Civ.* 5.56-59

157. Samosata (Turkey), 38 B.C.

Mark Antony instructs P. Ventidius Bassus to besiege Antiochus of Commagene on the pretext of his supposed Parthian sympathies, but in reality because of his great wealth. Antiochus offers to pay Ventidius one thousand talents, but Antony, out of jealousy, wishes to conclude the agreement himself. On Antony's arrival, the Roman soldiers become disgruntled on account of his treatment of Ventidius, and Antony is obliged to make do with Antiochus's new offer of three hundred talents.

Sources: Plutarch, *Antony* 34.2-4; Cassius Dio 49.20.5-22.2; Josephus, *Ant. Jud.* 14.439; *Bell. Jud.* 321-322

158. Aradus (Syria), 38 B.C.

Antony's lieutenant, C. Sosius, captures the island town after a long siege. The townsfolk are reduced to dire straits through famine and disease.

Sources: Cassius Dio 49.22.3

159. Jerusalem (Israel), 37 B.C.

When Antigonus, the exiled son of Aristobulus II, seizes power in Judaea, Herod marches on Jerusalem with the aid of Roman troops. Encamping north of the Temple, as Pompey had done (see 122, above), he commences construction of three embankments (*chōmata*) and erects towers (*purgoi*) on them. The Roman governor of Syria, C. Sosius, brings two legions. The defenders attack the embankment builders from the walls and attempt to repel the siege machinery (*organa*); underground, they tunnel through to attack Herod's forces unexpectedly; and, behind any threatened sector of wall, they erect new walls. By these tactics, they prolong the siege for five months. When the embankments are complete, Herod brings up machinery (*mēchanēmata*) to batter the north wall, and breaks through in forty days; it takes a further fifteen days to break through the inner wall to the Upper City, from where Herod finally launches an escalade of the Temple enclosure by 20 picked men and some Roman centurions. The defenders are slaughtered and the Temple porticoes burned; although Herod tries to halt the bloodshed and looting, Sossius permits his men to pillage, whereupon Herod offers gifts as an alternative. Sossius withdraws from Jerusalem and executes Antigonus.

Sources: Cassius Dio 49.22.3-6; Josephus, *Ant. Jud.* 14.465-466, 468-480, 484-486; *Bell. Jud.* 1.343-357

160. Praaspa (Iran), 36 B.C.

Mark Antony invades Parthia late in the year, with thirty wagon-loads of siege apparatus (*mēchanēmata*), including a battering-ram (*krios*) 80 feet (25m) long. However,

although wood is in short supply in Media, he marches ahead of the siege train, ordering Oppius Statianus to bring it along behind. Arriving at Praaspa, Antony builds embankments (*chōmata*) with some difficulty. King Phraates sends a cavalry force against Statianus to destroy the siege equipment (*mēchanai*), and the main Parthian army harasses the Roman foraging columns. Antony runs short of provisions, but cannot send a large foraging force, which would leave the siege-works unprotected against sorties, while a small foraging force would be attacked by the Parthians.

Phraates does not wish to prolong the action through the winter, so he offers an amnesty to allow Antony to withdraw. Antony accepts, and the Parthians immediately destroy the equipment (*mēchanēmata*) left *in situ* and scatter the embankments.

Sources: Plutarch, *Antony* 38.1-3; Cassius Dio 49.25.2-28.2

161. Metulum (Croatia), 35 B.C. (cf. fig. 20)

Octavian surrounds the main town of the Iapodes and begins to raise an embankment (*chōma*). The townsfolk make frequent sorties and harass the Romans from the town walls with captured artillery (*mēchanai*). When the town wall is breached, a new wall is built behind it. Two embankments (*chōmata*) are raised and four boarding-bridges (*gephyrai*) are thrown onto the new wall. The Romans feint at the other side of the town, while troops cross the bridges; Octavian observes from a tower (*purgos*). There is fighting on, and beneath, the bridges, and three are broken; nobody dares use the fourth bridge until Octavian, accompanied by Agrippa and a few guards, leads the way. Then a great crowd follows him and the bridge breaks under the weight. New bridges are constructed and the townsfolk sue for peace. They agree to receive a garrison but refuse to disarm, and are slaughtered in a last desperate stand; the town is burned.

Sources: Appian, *Ill.* 19-21; Cassius Dio 49.35.2-4; Florus 2.23

162. Segesta (Croatia), 35 B.C.

When Octavian approaches the town, the elders promise hostages and agree to a Roman garrison, but the townsfolk contest his entry. Octavian surrounds the place with a ditch and palisade, bridging the River Save, and raises two embankments (*chōmata*), which the

Segestans attempt to capture and burn, in vain. The town is captured on the thirtieth day, and Octavian imposes a garrison.

Sources: Appian, *Ill.* 23-24

163. Siscia (Croatia), 35 B.C. (cf. fig. 21)

Having agreed to provide hostages, the townsfolk close their gates against Octavian. The strongly walled town is protected by the Rivers Kulpa and Save, but Octavian obtains boats from which to assail the walls, and, when the townsfolk launch their own dug-out boats, the Romans engage them in riverine conflict. Finally, hearing that their allies have been defeated and cannot send help, the Siscians surrender the town.

Sources: Cassius Dio 49.37.1-6

164. Promona (Croatia), 34 B.C.

Octavian begins to encircle the mountain stronghold with a 40-stade (7½ km) wall, and mounts an assault before the circumvallation is complete. Enemy pickets on the surrounding hills panic in case they are cut off, and flee inside the stronghold. A relieving force arrives but is repulsed. The defenders rush out to skirmish and, as they retreat, the Romans manage to enter the town with them. A third of the townsfolk are slaughtered; the remainder take refuge in the citadel, where a Roman cohort is posted to keep watch. On the fourth night, the townsfolk break out and rout the cohort before they are captured. They surrender and the offending cohort is decimated.

Sources: Appian, *Ill.* 25-26; Cassius Dio 49.38.4; Strabo 7.5.5

165. Genucla (Romania), 29 B.C.

M. Licinius Crassus assaults this strongly defended fortress by land and from the river Danube, and captures it after hard fighting.

Sources: Cassius Dio 51.26.5-6

166. Mons Medullius (Spain), 26 B.C.

Octavian attacks the stronghold, whose proximity to the River Minius encourages many to take refuge there. He surrounds the place with a ditch, either 18 miles (26½ km) (Florus) or 15 miles (22 km) long (Orosius). Rather than submit to captivity, the defenders commit mass suicide.

Sources: Florus 2.33; Orosius 6.21.7-8

167. Splonum (Yugoslavia), A.D. 9

Germanicus Caesar attacks this strongly fortified and well-defended fortress, but makes no headway, whether using machines (*mēchanai*) or direct assaults. Then, a Celtic horseman dislodges a section of the battlements with a stone, knocking down the defender stationed there. The others flee to the citadel, thinking their fortress taken, and Germanicus easily occupies the place; those taking refuge in the citadel surrender.

Sources: Cassius Dio 56.11.1-2

168. Andetrium (Croatia), A.D. 9

Tiberius besieges the Dalmatian chieftain Bato in his well-provisioned hill-top fortress, but Bato's Daesitian tribesmen manage to disrupt the Roman supply-lines. Frustrated by inactivity and privation, the disaffected troops create havoc, which the Daesitians misinterpret as preparations for attack, whereupon Bato seeks terms for surrender. Scorning the difficult terrain, Tiberius seeks to appease his troops by launching a frontal attack, while observing from a platform. The Daesitians issue out to meet the attack, hurling rocks and rolling stones, singly, in barrels and in wagon-loads, at the Romans. But Tiberius sends wave after wave of reinforcements, and the Daesitians are soon cut off from retreat and slaughtered piecemeal. Those remaining in the town surrender.

Sources: Cassius Dio 56.12.3-14.7

169. Celenderis (Turkey), A.D. 19

The disgruntled Cn. Calpurnius Piso seizes the Cilician coastal fort of Celenderis, where he forms a legion out of deserters, slaves, new recruits and Cilicians. Cn. Sentius

Saturninus, who has taken command of the Syrian army, sounds the attack on the ramparts, whereupon the ditch is filled, ladders are brought up and the walls scaled, supported by an artillery (*tormenta*) barrage of spears, stones and firebrands. Piso surrenders and is referred to the emperor in Rome.

Sources: Tacitus, *Annales* 2.80-81

170. Hillfort of the Thracians (Mons Haemus) (Bulgaria), A.D. 26

C. Poppaeus Sabinus encamps on a narrow ridge, leading to the hillfort, and attempts to entice the Thracians into battle, to no avail. Accordingly, he establishes guard-posts (*praesidia*) around the hillfort, and links them with a 4-mile (5.9 km) ditch and parapet (*fossa loricaque*), to deny the Thracians food and water. He also erects an embankment (*agger*), from which spears, stones and firebrands can be hurled into the hillfort.

The Thracians begin to succumb to thirst, and livestock dying within the hillfort create an atmosphere of pollution. The aged chieftain, Dinis, surrenders, along with the old and the women, but some of the young warriors mount a nocturnal assault, hurling stones, stakes and branches at the Roman palisade, filling the ditch with brushwood, wicker panels (*crates*) and corpses, and mounting the battlements on ready-made gangways (*pontes*) and ladders (*scalae*). Most are repulsed and forced to surrender.

Sources: Tacitus, *Annales* 4.49-51

171. Cadra & Davara (Turkey), A.D. 36

The Cilician tribe of the Cietae migrate into the Taurus mountains, to avoid paying tribute to Rome, and settle on two hills, Cadra and Davara. The Syrian governor, L. Vitellius, sends M. Trebellius with a force of legionaries and auxiliaries to suppress the revolt. He surrounds the two hills with siege-works (*opera*) and forces their surrender.

Sources: Tacitus, *Annales* 6.41

172. Uspe (Russia), A.D. 49

C. Julius Aquila and Cotys I of Bosporus find the hill-town protected by a wicker-panelled (*crates*) palisade and a ditch. They bring up siege towers (*turres*) and create

havoc with spears and firebrands, and would have taken the town but for nightfall. Next day, the townsfolk offer to hand over ten thousand slaves, but the Romans, having no facilities to receive so many slaves, proceed with the assault, and, taking the town by escalade, slaughter the townsfolk.

Sources: Tacitus, *Annales* 12.16-17

173. Volandum (?Turkey), A.D. 58

Cn. Domitius Corbulo reconnoitres the fortified town (*castellum*), divides his troops into four, and mounts an assault. One group is massed in a *testudo* shield-formation to undermine the rampart; another group moves ladders (*scalae*) up to the walls. Many others fire spears and firebrands from artillery (*tormenta*), alongside stone-throwers (*libritores*) and slingers (*funditores*), to clear the walls of defenders. Before a third of the day has passed, the gates are overthrown and the walls scaled; the defenders are massacred, the populace sold into slavery, and the town sacked.

Sources: Tacitus, *Annales* 13.39

174. Artaxata (Armenia), A.D. 58

Corbulo sends light-armed troops to encircle the town and begin a long-range assault, but the townsfolk immediately open the gates and surrender themselves and their possessions. The town is burned and razed.

Sources: Tacitus, *Annales* 13.40-41

175. Legerda (Turkey), A.D. 59

The Armenian garrison (*praesidium*) issues out to meet Corbulo in battle, but is repulsed. The Romans finally break in, apparently by the use of an embankment (*agger*).

Sources: Tacitus, *Annales* 14.25

176. Jerusalem (Israel), A.D. 66 (cf. fig. 22)

C. Cestius Gallus, governor of Syria, encamps with a large force seven stades (1¼ km) to the north-east, on Mount Scopus, hoping to intimidate the townsfolk into surrender.

After three days, he enters the city, burning the Bezetha sector and advancing into the Upper City, whereupon the rebels retire to the Lower City and the Temple. For five days, Cestius attempts a series of escalades on the wall, but is hindered by missile fire from the towers. On the sixth day, Cestius leads an assault on the north side of the Temple by picked men and archers, under heavy missile fire from the porticoes, and soldiers in the *testudo* shield-formation begin to undermine the wall and prepare to burn the gates. However, not realizing that the defenders are close to surrender, Cestius suddenly withdraws to the camp on Mount Scopus. On the ensuing days, his retreat is turned into a rout, as the rebels harry his flanks and rearguard, and he abandons his battering-rams (*helepoleis*), catapults (*oxybeleis*) and other machines (*organa*) (Jos., *Bell. Jud.* 2.553).

Sources: Josephus, *Bell. Jud.* 2.527-542

177. Joppa (Israel), A.D. 66

Troops sent by Cestius Gallus easily storm the coastal town by sea and by land. The townsfolk are slaughtered, and the town is sacked and burned.

Sources: Josephus, *Bell. Jud.* 2.507-508

178. Belzedek (Israel), A.D. 67

When rebels take refuge in a strong tower in the village of Belzedek, the Roman commander, Antonius, is unwilling to expend energy on an assault, so he sets fire to the walls and retires, but the Jewish commander, Niger, escapes by leaping from the tower.

Sources: Josephus, *Bell. Jud.* 3.23-27

179. Gabara (Israel), A.D. 67

Vespasian storms Gabara, which has been stripped of defenders, and slaughters everyone from youths upwards. The town is destroyed, along with the neighbouring small towns and villages, whose inhabitants are enslaved.

Sources: Josephus, *Bell. Jud.* 3.132-134

180. Jotapata (Israel), A.D. 67 (cf. fig. 23)

Vespasian clears an approach road and encircles the town with a thousand cavalry, to prevent its commander, Josephus, from escaping. Next day, Vespasian encamps on a hill, seven stades (1¼ km) to the north, and encircles the town with a double cordon of infantry and a ring of cavalry. The town is situated on a spur, surrounded by ravines on three sides, and accessible only from the north. Vespasian launches an attack under cover of archers, slingers and other missile troops, but is repulsed; he repeats the exercise on five successive days, but makes no headway, whereupon he decides to build an embankment (*chōma*) and sends men to fetch wood and stones. Another party manufactures wicker screens (*gerra*), and a third provides the embankment-builders with earth. The boulders and other missiles, launched by the Jews, create a terrifying din, so Vespasian deploys all of his 160 artillery-pieces (*mēchanai*, *organa*), along with archers, javelin-men and slingers, to clear the walls. The Jews mount sorties to destroy the shelters, rout the workmen, and disrupt the construction work, so Vespasian links up the shelters into a continuous barrier.

When the Roman embankment (*chōma*) is almost at parapet level, Josephus heightens the town wall under cover of fireproof screens. As the Jewish sorties continue, Vespasian resorts to blockade, mounting a guard at the town exits. The Romans target their catapults (*oxybeleis*) at the townsfolks' water source, but the Jews scornfully hang dripping garments around the walls; they also manage to bring in supplies along an unguarded gully, until they are discovered. Jewish sorties break through to the Roman camp itself, but are repulsed by archers, slingers, stone-throwers (*lithoboloi*) and the majority of the artillery (*organa*).

As the embankment nears the wall, Vespasian brings up a battering-ram (*krios*), with covering fire from catapults (*katapeltai*) and other throwing engines (*aphetēria*), and archers and slingers. Josephus deadens the blows of the ram with sacks of chaff, but the Romans cut these down with hooks (*drepanai*), whereupon the Jews in desperation sally out to set fire to the siege machinery (*mēchanēmata*), the wicker screens (*gerra*), and the embankments (*chōmata*). In the mêlée, the ram head is broken off by a boulder dropped from the wall, but the machine is mended by evening, and working continuously through

the night, under cover of artillery-fire (*katapeltai, petroboloi*), finally breaches the wall early next morning. After a brief rest, Vespasian mounts an escalade to draw defenders away from the breach, while dismounted cavalry lay boarding bridges (*mēchanai epibatērioi, gephyrōmata*) under cover of archery fire. The Romans advance in the *testudo* formation, but the Jews pour boiling oil onto them and slippery boiled fenugreek onto the boarding bridges. The assault is called off at nightfall. Next day, the embankments (*chōmata*) are built higher, and three fifty-foot (15.4 m) iron-clad towers (*purgoi*), manned by javelin-men, archers and slingers, and equipped with artillery (*aphetēria organa*), are erected on them.

About five weeks into the siege, the embankments (*chōmata*) overtop the wall, and Titus leads a dawn assault, with the tribune, Domitius Sabinus, and a few legionaries, killing the sentries and entering the town. In the general slaughter, only women and children are spared for captivity, and the town is burned.

Sources: Josephus, *Bell. Jud.* 3.141-288, 316-339

181. Japha (Israel), A.D. 67

On the approach of M. Ulpius Traianus, the townsfolk exit the double-walled town to meet him in battle, and are defeated. The Romans follow the retreating Japhans through the first set of gates, wherupon the townsfolk, in panic, shut the second set of gates, before their own people can get through. A slaughter ensues between the two walls of the town, and Traianus summons Titus to witness the capture of the town. On his arrival, a general escalade is mounted, but the remaining townsfolk put up a desperate 6-hour struggle, during which the Romans are pelted from the roof-tops. Finally, all the male townsfolk are killed, and the women and children taken into slavery.

Sources: Josephus, *Bell. Jud.* 3.289-306

182. Tarichaeae (Israel), A.D. 67

Vespasian encamps near the town, strongly defended by walls on three sides and, on the fourth, by the Sea of Galilee. Jewish rebels attempt to disrupt the Roman camp-building, before retreating to their boats. Meanwhile, Titus, with 600 cavalry, and Traianus with

another 400, engage the defenders outside the town walls with much slaughter, until the Jews retreat inside. Titus's cavalry circumvents the defences at the water's edge, but some of the rebels escape on boats, others across country. Titus halts the slaughter when it appears that only *bona fide* townsfolk remain. Vespasian orders the town to be surrounded by guards to prevent anyone else escaping, and, next day, he hunts down the rebels on the lake, many of whom are taken into slavery.

Sources: Josephus, *Bell. Jud.* 3.462-505, 522-542

183. Gamala (Israel), A.D. 67 (cf. fig. 24)

Vespasian encamps on the heights around the hilltop town, which is defended by steep ravines except at one point, where a spur, fortified by wall and ditch, connects the town to the surrounding hills. Two of Vespasian's legions rapidly construct embankments (*chōmata*) and bring up siege equipment (*mēchanai*). A barrage from the catapults (*katapeltikoi*) and stone-projectors (*petroboloi*) covers the advance of battering-rams (*krioi*) at three different points, and the wall is breached. When the defenders retreat to the citadel, the pursuing Romans are impeded by the steepness of the narrow streets, and the low roofs cannot support the weight of men seeking a vantage point, so Vespasian evacuates his men. In the ensuing stalemate, many townsfolk escape down the unguarded ravines or through tunnels. Then, in the fourth week of the siege, three legionaries undermine a tower, and next day Titus leads an attack on the citadel, where the surviving townsfolk have fled. The defenders fire missiles and roll rocks down onto the Romans, but they are quickly overpowered and slain. Many choose to leap to their deaths in the ravines, and only two survive.

Sources: Josephus, *Bell. Jud.* 4.11-53, 62-83

184. Mount Tabor (Israel), A.D. 67

Vespasian sends the tribune Placidus with 600 cavalry to subdue the fortified table-top mountain. Placidus offers peace, intending to capture the rebels, and lures them out onto the plain, where the majority are slain. The survivors flee to Jerusalem, and the townsfolk surrender to Placidus.

Sources: Josephus, *Bell. Jud.* 4.54-61

185. Gerasa (Jordan), A.D. 68

L. Annius takes the town by storm, with a mixed force of cavalry and infantry. Males are killed, women and children enslaved, and the town is plundered and set ablaze.

Sources: Josephus, *Bell. Jud.* 4.487-489

186. Placentia (Italy), A.D. 69

Otho's general, T. Vestricius Spurrina, strengthens the defences against the Vitellians, under A. Caecina Alienus, but the hail of incendiary missiles causes the destruction of the amphitheatre. Caecina prepares screens, wicker panels and shelters (*plutei cratesque et vineae*) and, at dawn, his legionaries begin undermining the wall, throwing up an embankment (*agger*), and forcing the gates; meanwhile, other troops assault the walls with stones and arrows. The defenders throw javelins and roll mill-stones over the wall, crushing those beneath. Caecina calls off the assault and withdraws.

Sources: Tacitus, *Historiae* 2.19, 21-22

187. Cremona (Italy), A.D. 69

Arriving near Cremona at nightfall, the Flavian general, M. Antonius Primus, restrains his eager troops from attacking without reconnaissance. Next day, after a nocturnal battle with the Vitellians, Antonius encircles the Vitellian camp outside Cremona with a ring of troops (*corona*) and a missile exchange ensues. The Flavians collect pick-axes (*dolabrae*), hooks (*falces*) and ladders (*scalae*), and Antonius assigns different sectors of the rampart to different units, to inspire competition. When the Flavians advance in *testudo* shield-formation, the Vitellians roll heavy stones down onto them, to break the formation and make the men vulnerable to spear-thrusts. Inspired by the prospect of looting the town, the Flavians try to undermine the rampart and break the gates open, and climb onto the *testudo* formations to grapple with the enemy. The defenders tip a *ballista* over onto the *testudo* attacking the main gate, crushing the men but damaging the battlements in the process. A hail of stones from the Flavian artillery knocks down a

nearby wooden tower, and the gate is broken down with axes and swords. When the Vitellians make a dash for the nearby town, the Flavians set fire to outlying properties and utilize the taller buildings near the town as vantage points from which to throw missiles. The townsfolk surrender, but the Flavians run amok killing and looting for four days, and the town is burned; Antonius forbids his men to enslave any of the townsfolk.

Sources: Tacitus, *Historiae* 3.20, 27-34

188. Capitoline Hill, Rome (Italy), A.D. 69

Flavian partisans, headed by the *praefectus urbi*, T. Flavius Sabinus, are besieged on the Capitoline Hill by the unruly Vitellian Praetorians, who assault the outer gate of the Capitol, without waiting for artillery support (*tormenta*), and are met with a hail of stones and tiles from above. Their incendiary attack fires the gate, and Sabinus barricades the entrance with statuary, but the Praetorians are able to scramble up through neighbouring buildings and slaughter the defenders. The Temple of Jupiter is destroyed by the spreading fire. Sabinus is captured and publicly executed.

Sources: Tacitus, *Historiae* 3.69, 71-74

189. Jerusalem (Israel), A.D. 70 (cf. fig. 22)

Titus encamps 30 stades (5½ km) from Jerusalem and leads a cavalry reconnaissance of the city. He places his main camp on Mount Scopus, seven stades (1¼ km) to the north-east, with another camp three stades (½ km) to the rear, and a third camp on the Mount of Olives, six stades (1 km) to the east of the city; this camp is attacked while under construction. Titus tries to negotiate with the townsfolk, but is rebuffed. In four days, Titus clears the ground from Mount Scopus to the (“third”) city wall and establishes two new camps, two stades (370 m) to the north-west and west. After another mounted reconnaissance, he targets the level ground of the western defences, where the junction of the “third” wall with the Hippicus tower is unfinished. A further attempt at negotiation is rebuffed, so the legions devastate the suburbs and fell timber to build three embankments (*chōmata*). Archers and javelin-men are positioned between the embankments, with arrow-firers (*oxybeleis*), catapults (*katapeltai*) and stone-projectors (*litho-*

boloi) in front, and, although the Jews disrupt the work with artillery captured from the Antonia garrison (Jos., *Bell. Jud.* 5.267) and from Cestius (above, 176), the legionaries are protected by “wicker spread over palings”. In five days, the embankments are close enough to the city wall to bring up battering-rams (*krioi*) under cover of artillery-fire. The Jewish rebels shower the Roman machines (*mēchanēmata*) with firebrands, shoot at the men working the rams (*helepoleis*), and sally out to destroy the wicker screens (*gerra*). During fierce fighting around the Roman machinery (*mēchanai*), the Jews set fire to the siege-works (*erga*), and almost manage to destroy the artillery (*organa*), although cavalry and archers are protecting it. The Romans erect a 50-cubit (23 m) iron-clad tower (*purgos*) on each of the three embankments, manned by missile troops and light artillery (*hoi kouphoteroi tōn organōn*) to suppress the defenders. After ten days, the largest of the battering-rams (*helepoleis*), nicknamed *Nikōn* (“Victory”) by the Jews, breaches the wall, and the Romans pour through, opening the gates for their comrades, but the Jews withdraw to the second line of walls.

Titus razes a long section of the “third” wall and moves his camp into the Bezetha suburb. A battering-ram (*helepolis*) is set to work and, on the fifth day, the Romans are able to storm the wall. However, when Titus fails to press his victory, offering negotiation instead, the Jews launch a desperate attack, forcing the Romans back through the breach. The Jews hold the breach for three days, before the Romans again storm through; Titus razes the northern sector and garrisons the towers on the surviving southern sector. After a four-day ceremonial parade, designed to overawe the defenders, Titus begins work on four embankments (*chōmata*), two to the west of the city, 30 cubits (14 m) apart, and two against the Antonia, twenty cubits (9 m) apart. The latter are constructed under heavy fire from the Zealots, using the 300 arrow-firers (*oxybeleis*) and 40 stone-projectors (*lithoboloi*) stored in the Antonia. All the time, Titus encourages the Jews to desert, offering free passage; those captured while foraging are crucified, to demoralize the defenders, and famine leads the rebels to commit various atrocities to guarantee their own survival.

The embankments are completed in seventeen days, but those at the Antonia are undermined by the Zealots. Two days later, the rebels destroy the other embankments

and burn the machines (*mēchanai*, *organa*) under covering fire from the wall. In the subsequent council of war, Titus discounts both rebuilding the embankments, owing to the lack of wood, and throwing a cordon of troops around the city, owing to the inefficiency of this form of blockade, but prefers the option of a circumvallation, so a 39-stade (7¼ km) wall, with thirteen forts (*phrouria*), is constructed in three days. However, not wishing to delay the capture of the city, Titus then orders embankments (*chōmata*) to be constructed at the Antonia fortress, for which wood has to be procured from a distance of 90 stades (16½ km). The work is completed in 21 days, and the battering-rams (*helepoleis*) are brought up, despite the stones dropped from the walls. A party of soldiers in *testudo*-formation undermine the wall, which collapses into the tunnel that the Zealots had dug to undermine the previous embankments. However, they have constructed another wall inside. Twelve soldiers, mounting an escalade of the wall, are overwhelmed by the shower of arrows and boulders from the battlements. Two days later, twenty-four men, including a standard-bearer and a trumpeter, mount the wall by night, summoning reinforcements by trumpet blast, but the Jews mount a furious defence of the Temple.

The Antonia is now demolished in seven days, to make a broad ascent to the Temple, and, using wood fetched from 100 stades (18½ km) away, four more embankments are raised, against the western and northern porticoes. The rebels burn both porticoes, having lured Roman troops onto the roof. Titus batters the west wall of the Temple platform for six days with the stoutest battering-ram (*helepolis*), to no avail, and unsuccessfully attempts to undermine the north gate using machines (*organa*) and crowbars (*mochloi*). An escalade led by the standard-bearers is repulsed, so Titus turns his attention to the Temple itself, where the rebels have taken refuge, and orders the gates to be set on fire.

In the following days, during skirmishing in the Temple precincts, the Temple is destroyed by fire, despite Titus's wish to preserve it intact, and the soldiers' looting and wholesale slaughter spreads to the Lower City.

Many of the rebels escape to Herod's palace in the Upper City, where embankments (*chōmata*) are constructed in eighteen days, although wood is difficult to procure, and

machines (*mēchanai*) are brought up. When the battering-rams (*helepoleis*, *krioi*) create a breach and topple some of the towers, the rebels lose heart and flee. The Romans run amok and the city is destroyed.

Sources: Josephus, *Bell. Jud.* 5.51-97, 106-135, 258-347, 356-361, 446-451, 466-511, 522-524; 6.5-32, 54-80, 149-168, 177-192, 220-228, 232-284, 323-355, 374-377, 392-408; Cassius Dio 65.4.1-7.2; Tacitus, *Historiae* 5.11-13

190. Machaerus (Jordan), A.D. 71 (cf. fig. 25)

Sex. Lucilius Bassus reconnoitres the hill town, which is surrounded by steep valleys and provided with an impregnable citadel and many defensive machines (*mēchanēmata*). He raises an embankment (*chōma*) on the western side (eastern, according to Josephus), where a ravine 100 cubits deep (46 m) separates it from the neighbouring hill. The rebels occupy the citadel, from where they mount sorties to disrupt the Roman work. One of them, Eleazar, is captured, and the rebels trade the town in exchange for his life and their safe passage. The townsfolk attempt to flee by night, but they are intercepted by the Romans, their menfolk killed, and the women and children enslaved; Bassus keeps his promise to the rebels.

Sources: Josephus, *Bell. Jud.* 7.163-177, 190-209

Archaeological evidence discussed on pp. 112-114, above.

191. Masada (Israel), A.D. 73 (cf. fig. 26)

L. Flavius Silva encamps on the west side, where the fortress plateau is linked to the surrounding hills by a rocky outcrop, 300 cubits (139 m) short of the summit. Although it is awkward for supplies there, it is the only point where an assault can be launched. He constructs a wall around the whole fortress, posts garrisons, and mounts guards. Then he raises an embankment (*chōma*) on the rocky outcrop, 200 cubits high (92 m), with a 50-cubit (23 m) stone-built runway, upon which his machines (*mēchanēmata*) are sited. He constructs an iron-clad, 60-cubit (28 m) tower, as a platform for arrow-shooters (*oxybeleis*) and stone-projectors (*petroboloi*), and brings up a battering-ram (*krios*).

The wall is breached, but the Jewish Sicarii have built a resilient earth-and-timber wall inside, which is unaffected by the battering, so Silva orders it to be set on fire.

Overnight, the Sicarii commit mass suicide. In the morning, the Romans extend bridges (*epibathrai*) from the embankment (*chōma*) and enter the deserted fortress.

Sources: Josephus, *Bell. Jud.* 7.252-253, 275-319, 389-406

Archaeological evidence discussed on pp. 114-118, above.

192. Hillforts of the Dacians (Romania), A.D. 102

Trajan captures some mountain strongholds of the Dacians, where he finds weaponry and machinery (*mēchanēmata*) captured from Cornelius Fuscus in A.D. 86.

Trajan's Column suggests that forts were built (LXV; LXVIII), artillery-positions established (LXVI), and the *testudo* shield-formation (LXXI) employed.

Sources: Cassius Dio 68.9.3-6; Trajan's Column, scenes LXV-LXVII (casts 161-172), LXVIII-LXXI (casts 173-182)

193. Sarmizegethusa (Romania), A.D. 106

Trajan takes the Dacian royal city of Sarmizegethusa Regia, and the king, Decebalus, commits suicide to avoid capture.

Trajan's Column suggests that scaling-ladders (CXIII), pick-axes (*dolabrae*) (CXVI), and the so-called "ship's prow sheds" (CXIV) were employed. An embankment (CXVII) was perhaps erected, and a circumvallation thrown around the town (CXIII).

The defenders will have rolled barrels downhill (CXIV), thrown down lumps of masonry (CXVI), and finally set their town on fire (CXIX) before fleeing (CXXII).

Sources: Cassius Dio 68.14.3; Trajan's Column, scenes CXI-CXII (casts 293-299), CXIII-CXVI (casts 300-314), CXVII-CXXII (casts 315-332), CXXIII-CXXVI (casts 333-342)

194. Edessa (Turkey), A.D. 116

Lusius Quietus captures the town, which is sacked and burned.

Sources: Cassius Dio 68.30.2

195. Seleucia (Iraq), A.D. 116

Sex. Erucius Clarus and Ti. Julius Alexander Julianus capture and burn the town.

Sources: Cassius Dio 68.30.2

196. Hatra (Iraq), A.D. 117 (cf. fig. 27a)

Trajan makes an attempt on the desert town, but, although the wall is breached and the cavalry sent forward, the assault is repulsed. Trajan himself is almost shot while reconnoitring the town, and a cavalryman of his bodyguard is killed. Poor weather and troublesome insects force him to withdraw.

Sources: Cassius Dio 68.31.1-4

Archaeological evidence discussed on pp. 125-127, above.

197. Bettir (Israel), A.D. 134/135 (cf. fig. 28)

C. Julius Severus lays siege to the strong hill-top refuge. The Jewish rebels have constructed subterranean passages and strong defensive walls. Severus blockades them, and reduces them by starvation and thirst.

Sources: Eusebius, *Historia ecclesiastica* 4.6.3; Cassius Dio 69.12.2-13.3

Archaeological evidence discussed on pp. 121f., above.

198. Ctesiphon (Iraq), A.D. 165

C. Avidius Cassius captures the place and burns the Parthian palace. Unfortunately, the nearby friendly town of Seleucia is also looted and burned. The Romans contract plague, and sickness and shortage of supplies force them to withdraw.

Sources: Cassius Dio 71.2.3-4; *Historia Augusta*, *Verus* 7.1, 8.1-4

199. Byzantium (Turkey), A.D. 193-195

L. Marius Maximus besieges the coastal city, where C. Pescennius Niger has equipped the massive walls with all manner of artillery (*mēchanai*) for shooting stones and beams, and machines with hooks (*harpagai*) for ensnaring ships and enemy machinery (*mēchanēmata*), mostly designed by Priscus (see also below, 202). The townsfolk pelt

their assailants with masonry and bronze statues. When close to starvation, the townsfolk continue to resist; some sail away during a storm, when they cannot be pursued; others resort to cannibalism. A concerted effort to escape by sea is frustrated by a merciless naval attack, and the survivors remaining in the city surrender, after almost two years of siege. Niger's forces in the city are killed, and the walls are demolished.

Sources: Cassius Dio 74.6.3, 10.1-14.6

200. Ctesiphon (Iraq), A.D. 197

Septimius Severus captures Ctesiphon in a surprise attack, and allows the soldiers to plunder the city. They kill vast numbers, and take thousands of women and children prisoner. King Vologaeses escapes, but his treasury is captured.

Sources: Cassius Dio 76.9.3-4; Herodian 3.9.9-11

201. Hatra (Iraq), A.D. 198 (cf. fig. 27a)

Severus attacks the city for allegedly supporting his enemy, Pescennius Niger. The Hatrenes fire missiles, stones and clay containers of poisonous insects; many Romans are killed, more are wounded, and their siege machinery (*mēchanēmata*) is burned. Sickness also takes its toll, and the operation is abandoned. The Praetorian tribune, Julius Crispus, is executed for criticizing the conduct of the siege, and Severus's general, Julius Laetus, is executed for sowing discord in the ranks.

Sources: Cassius Dio 76.10.1-3; Herodian 3.9.1, 4-7

Archaeological evidence discussed on pp. 125-127, above.

202. Hatra (Iraq), A.D. 199 (cf. fig. 27a)

Severus's second attempt proves very costly. The Hatrene cavalry mounts swift and violent sorties, and the Romans suffer from the defenders' hand-thrown missiles, archery and artillery. Some of their catapults (*mēchanai*) discharge two missiles at once, even hitting many of Severus's bodyguard. The defenders on the walls pour down naphtha and bitumen, killing many soldiers and destroying all of Severus's machines (*mēchanēmata*), except those designed by Priscus (see above, no. 199). When the wall

is breached, Severus offers to negotiate, but is rebuffed, and the damaged wall is repaired overnight. The European veterans mutiny in frustration, and the Syrian troops are unequal to the task, so, after twenty days, Severus withdraws from the city.

Sources: Cassius Dio 76.11.1-13.1

Archaeological evidence discussed on pp. 125-127, above.

203. Aquileia (Italy), A.D. 238

The inhabitants repair their dilapidated fortifications and, having laid in extra supplies, bar the gates against the invading forces of Maximinus Thrax. When they bombard his advance guard with stones, spears and arrows from the battlements, Maximinus attempts to negotiate, but is rebuffed, so he devastates the surrounding countryside. A cordon of troops is established around the town, and the area outside the walls is leveled. Timber is salvaged from the demolished buildings to construct various siege machines (*mēchanai*), and Maximinus exhorts the soldiers to demolish a section of town wall. As well as throwing down rocks, the townsfolk ignite a mixture of sulphur, bitumen, pitch and oil, and pour it onto the besiegers, with horrific results. They also target the machinery with fire-arrows soaked in pitch and resin, and burn them down. Having destroyed the local resources, Maximinus's army begins to feel the effects of famine and thirst, as the Aquileians have been throwing their dead into the river. They soon become disgruntled, assassinate Maximinus, and abandon the siege.

Sources: Herodian 8.2.2-6.4; Zosimus 1.15.1-2; Historia Augusta, *Maximini Duo* 21.6-23.7, 24.2-3

204. Castra Praetoria, Rome (Italy), A.D. 238

In the unrest following the accession of Pupienus and Balbinus, the Praetorian Guard, loyal to Maximinus Thrax, is attacked by a pro-Gordian mob. Armed with weapons from the public armouries, and reinforced by gladiators, they assault the *Castra Praetoria*, but the Praetorians defend their battlements with bows and long spears. When the mob eventually withdraws, the Praetorians mount a sortie, killing many, including gladiators, before retreating to the safety of their camp. Balbinus tries to negotiate, but

is rebuffed. Finally, the camp water supply is cut, whereupon the Praetorians rampage through the streets. They are pelted from the upper storeys with tiles, stones and pots, so they retaliate by setting fire to some wooden balconies, creating a conflagration.

Sources: Herodian 7.11.6-9, 12.2-7; Historia Augusta, *Maximus et Balbinus* 10.4-8

205. Stronghold of the Carpi (?Romania), A.D. 247

The emperor, Philippus Arabicus, tries to engage the marauding Carpi in battle, but they flee to a stronghold (*phrourion*) and are besieged. Seeing that their comrades are rallying for an attack, they mount a sortie on Philippus, but are defeated and sue for peace.

Sources: Zosimus 1.20.1-2

206. Agrippina (Germany), A.D. 259

After a quarrel, Gallienus's son, Saloninus, and the Praetorian prefect, Silvanus, are besieged by Postumus, the military commander on the Rhine. In order to end the siege, the garrison surrender Saloninus and Silvanus to Postumus, who puts them to death.

Sources: Zosimus 1.38.2; Historia Augusta, *Gallieni duo* 4.3; *tyranni triginta* 3.1-9

207. Mediolanum (Italy), A.D. 268

Gallienus besieges his rebellious general, Aureolus, using all kinds of machines (*omnia genera machinationum*). However, Gallienus is murdered by his own generals in a plot.

Sources: Aurelius Victor, *de Caesaribus* 33.17-19

208. Tyana (Turkey), A.D. 271

The town closes its gates to Aurelian; enraged, he threatens that he will not leave even a dog alive in the town, and the soldiers eagerly anticipate plunder. One of the townsfolk, Heraclammon, panics and betrays a part of the circuit where the ground slopes up like a siege-embankment; Aurelian executes the man as a traitor. However, he is dissuaded from destroying the town by the philosopher, Apollonius, and forbids the soldiers to plunder. When reminded of his threat, he orders all the dogs in the town to be killed.

Sources: Historia Augusta, *Aurelianus* 22.5-24.9; Anonymus continuator of Cassius Dio 10.4

209. Palmyra (Syria), A.D. 272

Aurelian encircles the town, hoping to take it by storm. Queen Zenobia has stockpiled arrows, spears and stones, and the emperor complains that every section of wall is protected by two or three catapults (*ballistae*), which even shoot fire. In despair, he attempts to negotiate, but is rebuffed. However, Aurelian subverts Zenobia's Saracen and Armenian allies, prevents Persian aid from getting through, and finally captures Zenobia, as she attempts to flee. Suffering from famine, the townsfolk seek terms for surrender and receive a garrison. When they later kill the garrison, Aurelian razes the town, permitting indiscriminate slaughter.

Sources: Historia Augusta, *Aurelianus* 26.1-28.5, 31.1-10; Zosimus 1.54.2-56.2, 60.1-61.1; Anonymus continuator of Cassius Dio 10.5

210. Cremna (Turkey), A.D. 278 (cf. fig. 29)

When Lydius (or Palfuerius) begins ravaging the countryside, the arrival of a Roman army (possibly led by the emperor Probus) forces him to seek shelter in the hill-top town. Lydius turns over areas of the town for agricultural production, attempts to secretly import livestock, and finally resorts to killing non-combatants to preserve dwindling supplies. When one of his artillerymen ("a man skilled in the construction of *mēchanai*, and capable of shooting missiles from *mēchanai* with great accuracy", Zos. 1.70.1) is punished for missing his aim, he defects to the Romans and uses his skill to target his erstwhile commander. After Lydius's death, the defenders surrender.

Sources: Zosimus 1.69.1-70.5; Historia Augusta, *Probus* 16-17
Archaeological evidence discussed on pp. 122-124, above.

211. Gesoriacum (France), A.D. 293

Constantius I blockades the town and builds a mole (*vallum*) across the harbour mouth to trap the enemy vessels inside and deny access to a relieving fleet; the garrison surrenders.

Sources: *Panegyrici Latini* 8 (5), 6.1-4; 6 (7), 5.2

212. Alexandria (Egypt), A.D. 296-297

When L. Domitius Domitianus is declared Augustus at Alexandria, Diocletian himself besieges the town for eight months, finally permitting the town to be looted.

Sources: Eutropius, *Breviarium* 9.23; Orosius, *Contra paganos* 7.25.8

213. Verona (Italy), A.D. 312

Invading Italy, Constantine I attempts to negotiate with the Praetorian prefect, Ruricius Pompeianus, in command of Verona. The River Athesis prevents an assault from the west, so troops ford the narrow stream upriver and blockade the town from the other side. Hemmed in on two sides, Pompeianus decides to mount a sortie, which develops into a major engagement in which he is killed. The town surrenders.

Sources: *Panegyrici Latini* 12 (9), 8.1-4, 11.1; 4 (10), 25.3-7

214. Byzantium (Turkey), A.D. 324

After defeating Licinius's fleet in the Hellespont, Constantine blockades the town by sea.

Erecting an embankment (*chōma*) up to wall-height, he mounts siege-towers on it to overlook the walls and subject Licinius's guards to archer-fire. Then, he sends forward battering-rams (*krioi*) and other machines (*mēchanai*), whereupon Licinius flees the town. Byzantium surrenders to Constantine.

Sources: Zosimus, *Historia nova* 2.23.1-26.3

215. Mursa (Croatia), A.D. 351

On Magnentius's approach, the gates are closed and the battlements are manned by missile troops. As he has no siege machinery (*mēchanai*), he attempts to burn down the

gates, hoping to melt the iron sheathing, but the defenders pour water from the battlements and extinguish the fire. The arrival of Constantius II draws Magnentius away.

Sources: Zosimus, *Historia nova* 2.49.3-50.4

216. Forts on the River Meuse (France), A.D. 357

Julian blockades six-hundred Franks, who have taken refuge in two abandoned forts. After fifty-four days, he breaks the ice on the river, so that the Franks cannot surreptitiously cross over by night, so they surrender in despair.

Sources: Ammianus Marcellinus, *Res gestae* 17.2.1-3

217. Bezabde (Turkey), A.D. 360

Constantius II encamps and reconnoitres the Persian-occupied town; when his offer to negotiate is rebuffed, he prepares for a siege. The *testudo* shield-formations of the legionaries, attempting to undermine the walls, are broken under the torrent of missiles from above. The wicker panels (*vimineae crates*) protecting the Roman advance are smashed by storage jars, millstones and column drums, thrown from above, and battle rages around the shelters (*vineae*) and artillery (*tormenta*), with stones and slingshot creating destruction on both sides. The Romans construct embankments (*aggeres*) and bring up a massive battering-ram (*aries, machina*), which the Persians had used at Antioch and subsequently abandoned, and several smaller ones. The Persians attempt to burn them with fire-arrows (*malleoli*), but the machines have been fireproofed with wet hides and patchwork, or with alum coating. However, in the process of smashing a tower, the giant ram is snared in a lasso, and the Persians pour down boiling pitch. A sortie with firebrands and iron fire-pots is repulsed, but a second one, with iron baskets of burning brushwood, succeeds in igniting all the siege-machinery (*machinae*), except the giant ram, which is pulled free of the ensnaring ropes, and salvaged, half-charred. Next morning, under cover of *ballistae*, deployed two per embankment (*clivus structilis*), the Romans assault the walls with ladders (*scalae*), as well as mattocks (*ligones*), pick-axes (*dolabrae*) and crowbars (*vectes*), and a ram is brought forward against one of

the towers. But the Persians surreptitiously set fire to one of the embankments by inserting live coals into the structure, and the Romans abandon the enterprise.

Sources: Ammianus Marcellinus, *Res gestae* 20.11.6-25

218. Aquileia (Italy), A.D. 361

Julian's deputy, Immo, throws a double cordon around the town, where two mutinous legions have taken refuge. His offer to negotiate is rebuffed, so he attempts to undermine the walls under cover of screens (*plutei*) and wicker panels (*crates*), using various iron tools (*ferramenta*). Ladders (*scalae*) are deployed, but a hail of stones and missiles from artillery (*tormenta*) on the town wall prompts a general retreat. The river prevents battering-rams approaching the walls, so the besiegers mount two-storey towers on lashed-together boats. But these are inundated with combustible material and set ablaze with fire-arrows (*malleoli*) soaked in pitch. Some towers capsize; the crews of others are picked off by artillery (*tormenta*); and those who land at the other side are crushed by enormous stones from above. After another failed assault, Immo resorts to blockade, cutting the town's water supply and diverting the river, but the town has wells. Finally, learning of the death of Constantius, the mutineers surrender, escaping punishment on the grounds that they were only following the orders of one of their officers.

Sources: Ammianus Marcellinus, *Res gestae* 21.11.2-12.20

219. Anatha (Iraq), A.D. 363

Julian's deputy, Lucillian, launches an amphibious night assault on the Euphrates island fortress. When he is detected, Julian himself sails across with siege machinery (*machinae obsidionales, mēchanai*), but, realising the risk involved in the operation, he decides to negotiate instead. The garrison surrenders and the fort is burned.

Sources: Ammianus Marcellinus, *Res gestae* 24.1.6-10; Libanius, *Orationes* 18.218; Zosimus 3.14.2-4

220. Diacira (Iraq), A.D. 363

The townsfolk flee at the approach of Julian's army. The Romans find stores of grain and salt. They kill some women who have remained in the town, and burn the place.

Sources: Ammianus Marcellinus, *Res gestae* 24.2.3; Zosimus 3.15.2-4

221. Ozogardana/Zaragardia (Iraq), A.D. 363

The townsfolk flee at the approach of Julian's army, and the town is sacked and burned.

Sources: Ammianus Marcellinus, *Res gestae* 24.2.4; Zosimus 3.15.4

222. Pirisabora (Iraq), A.D. 363

Julian reconnoitres the place and attempts to negotiate, but is rebuffed, so he throws a triple cordon of men around the town. In the subsequent missile exchange, the defenders spread out loose garments from the battlements. After nightfall, Julian brings up machinery (*machinae*) and begins filling the ditch. At dawn, a battering-ram (*aries*) breaches a corner tower, and the Romans burst in, burning the houses and setting up machines (*mēchanai*) and artillery (*catapultae atque ballistae*) in the ruins. The defenders, retreating to their citadel, reply with arrows and hand-thrown stones. Next day, Julian leads a *testudo* shield-formation in an assault on a gate, but is repulsed. Rather than bring up shelters (*vineae*) for the erection of embankments (*aggeres*), Julian starts to construct a siege-tower (*helepolis*), whereupon the townsfolk surrender. They are granted safe conduct, but the place is looted and burned.

Sources: Ammianus Marcellinus, *Res gestae* 24.2.9-22; Libanius, *Orationes* 18.227-228; Zosimus 3.17.3-18.3

223. Maiozamalcha (Iraq), A.D. 363

Julian reconnoitres the rocky plateau on foot and narrowly escapes a Persian ambush. He moves his camp nearer and, while the cavalry pillage the neighbourhood, the infantry throw a triple cordon around the town. When his offer to negotiate is rebuffed, he builds high platforms (*suggestūs*), levels up the ditches, digs tunnels (*cuniculi*) under cover of shelters (*vineae*), and the engineers (*artifices*) set up the artillery (*tormenta muralia*).

Men move forward in the *testudo* shield-formation, or protected by wicker screens (*vimineae crates*), and a bombardment of arrows and stones is laid down by the *ballistae* and onagers. The Persians reply with archery-fire, sling-stones and fire-missiles (*malleoli*), and by rolling down huge stones. The assault, abandoned at noon, is renewed next day. Finally, a battering-ram (*aries*) brings down a tower and section of wall; fighting continues at the breach until nightfall. Meanwhile, the tunnels are completed, so the assault is renewed and troops pour into the town. Wholesale slaughter ensues, but the garrison commander, Nabdates, and eighty others are taken prisoner. The town is razed and the spoil is divided according to each man's entitlement.

Sources: Ammianus Marcellinus, *Res gestae* 24.4.2-30; Libanius, *Orationes* 18.235-242; Zosimus 3.20.2-22.7

224. Fort near Seleucia (Iraq), A.D. 363

Julian reconnoitres the fort (*castellum*) but is fired upon by the mural artillery (*tormentum muralia*), and his companion is wounded. He resolves to mount an assault, and the shelters (*vineae*) and other equipment are ready by nightfall. When the garrison mounts a sortie, supported by Persian reinforcements, Julian repulses them vigorously, and the fort is captured and burned.

Sources: Ammianus Marcellinus, *Res gestae* 24.5.6-11

225. Cyzicus (Turkey), A.D. 365

The usurper, Procopius, is held at bay by arrows, sling-shot and other missiles, and the defenders stretch an iron chain across the harbour mouth, to deny access by sea. However, an enterprising tribune severs the chain with an axe, under cover of a *testudo* shield-formation, assembled on the deck of his ship. Sailing into the harbour, Procopius captures the town and spares the garrison, except for their commander, Serenian, who is imprisoned.

Sources: Ammianus Marcellinus, *Res gestae* 26.8.7-11

Appendix 2: *Illustrations*

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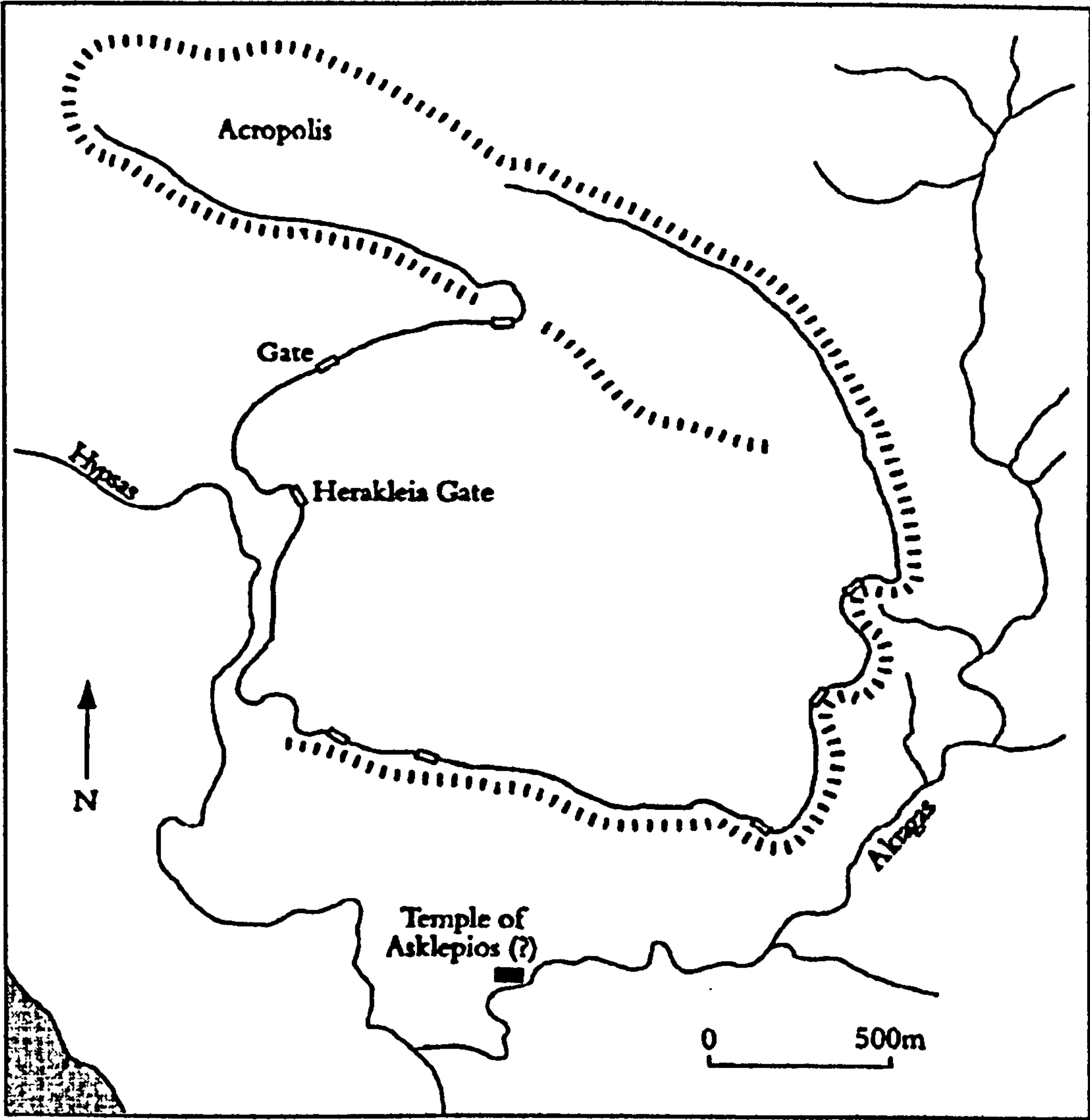


Figure 1: Agrigentum (no. 38)
(after Lazenby 1996)

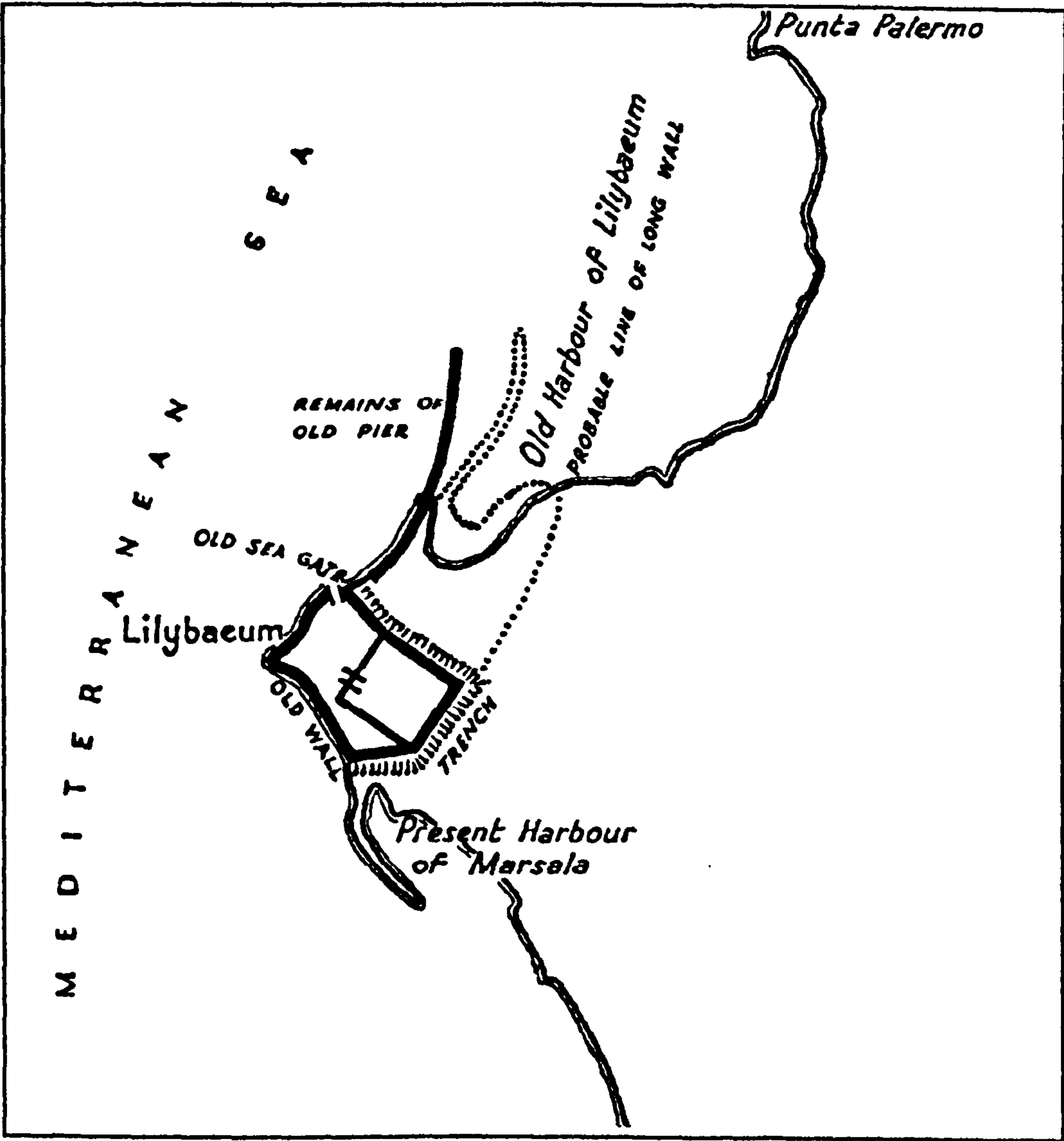


Figure 2: Lilybaeum (no. 44)
(after Walbank 1957)

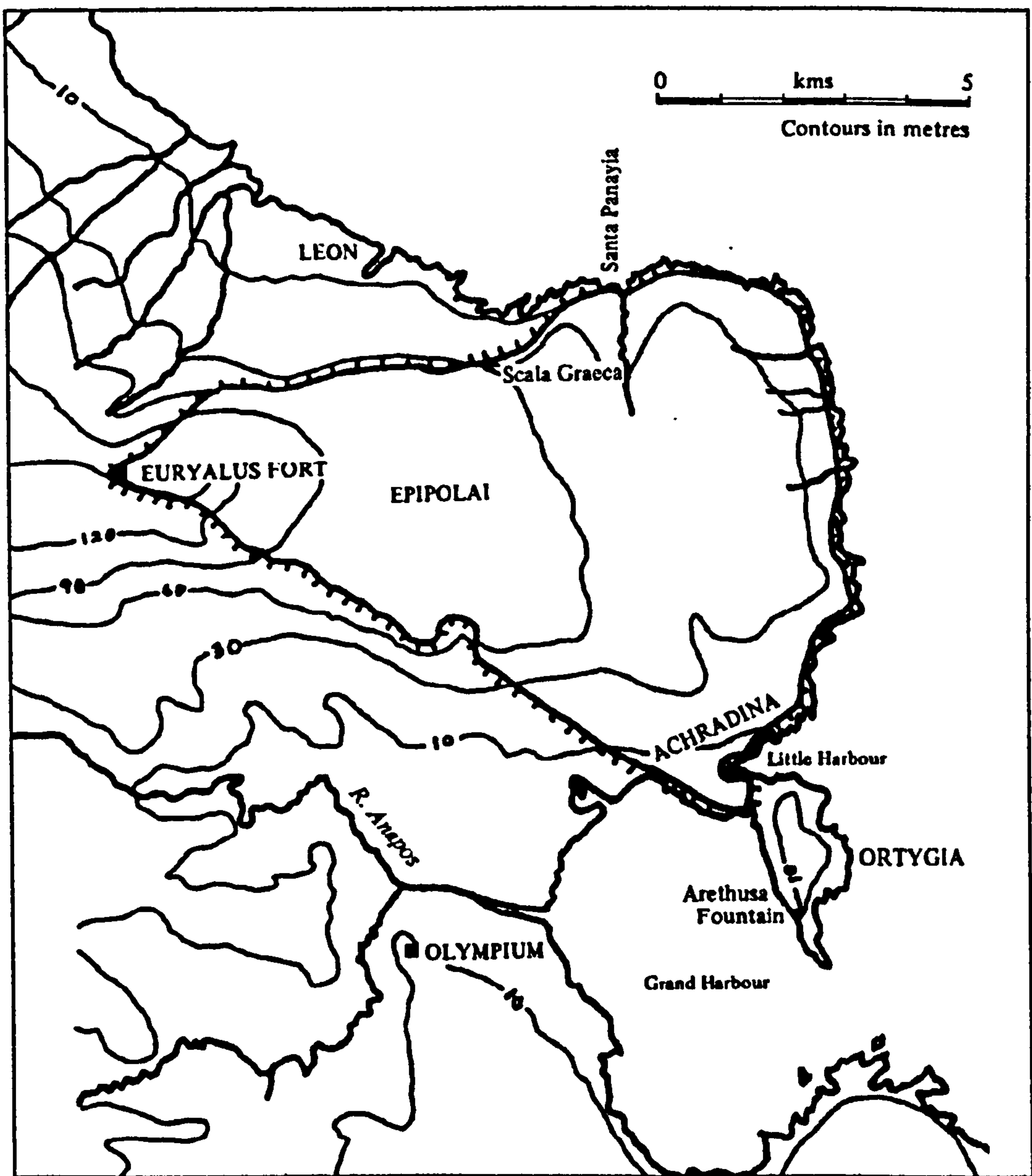


Figure 3: Syracuse (no. 50)
(after Lazenby 1978)

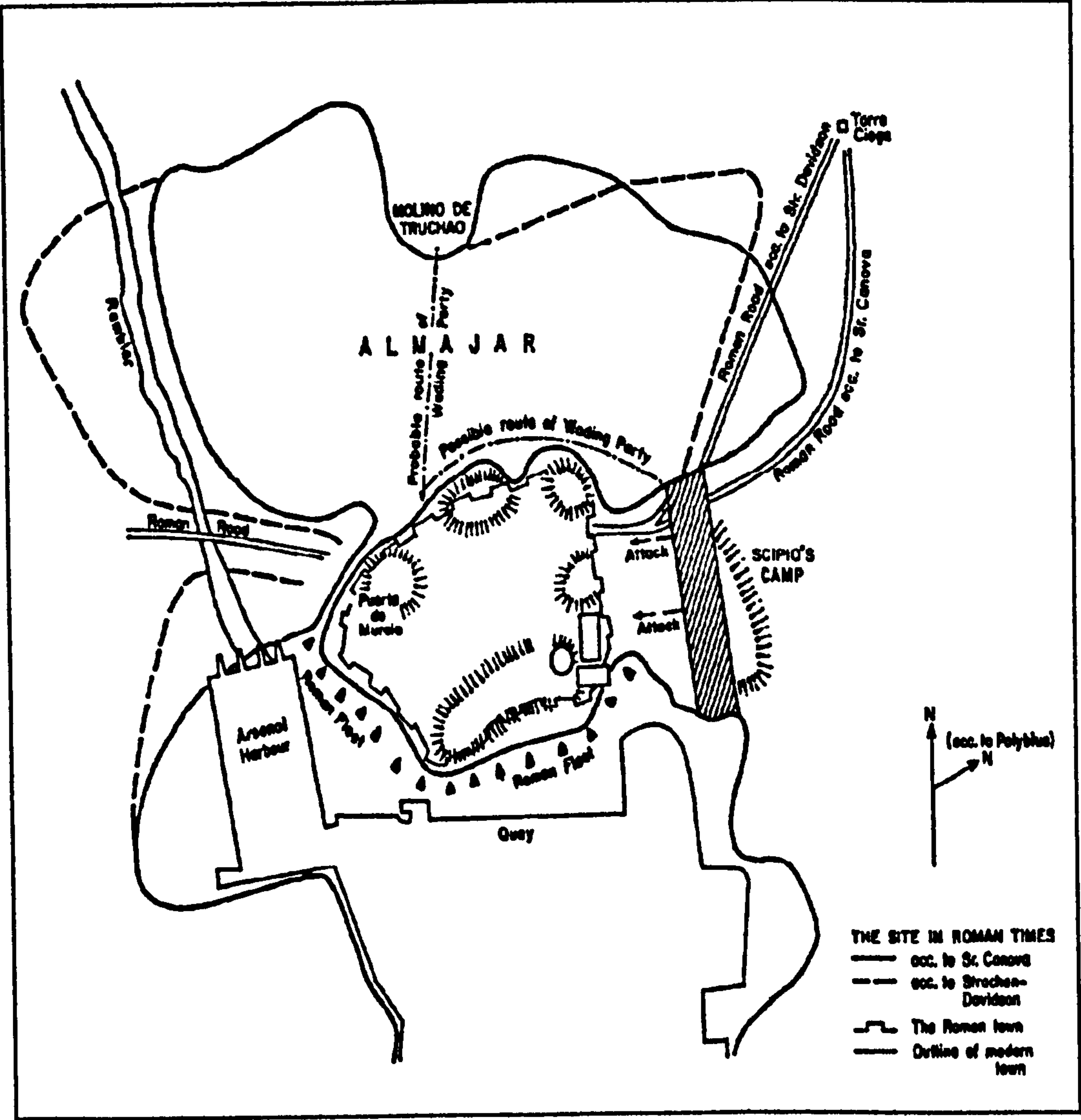


Figure 4: Cartagena (no. 55)

(after Scullard 1970; camp location suggested on topographic grounds.)

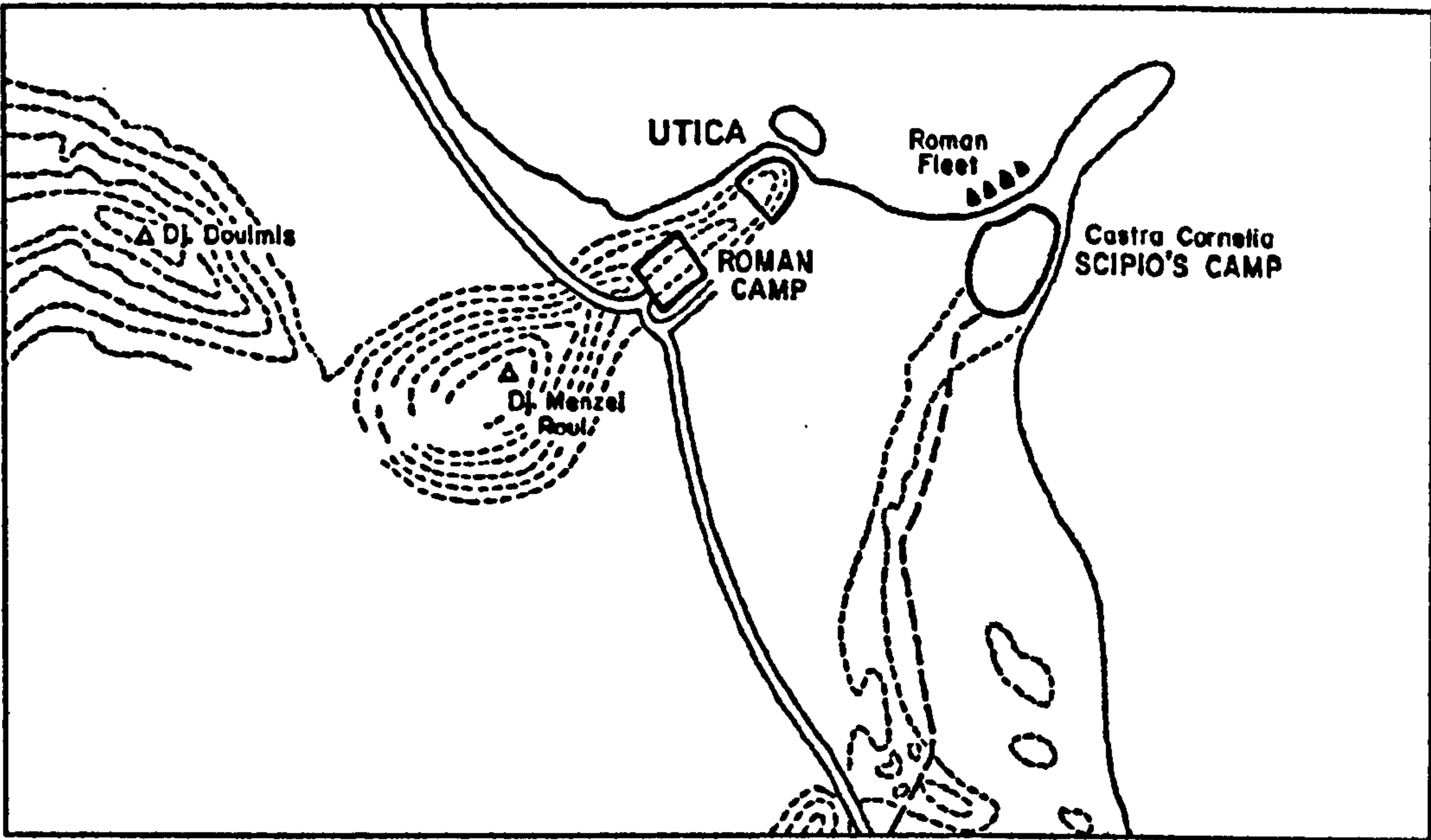


Figure 5: Utica (nos. 64 & 140)
(after Scullard 1970; camp locations suggested on topographic grounds.)

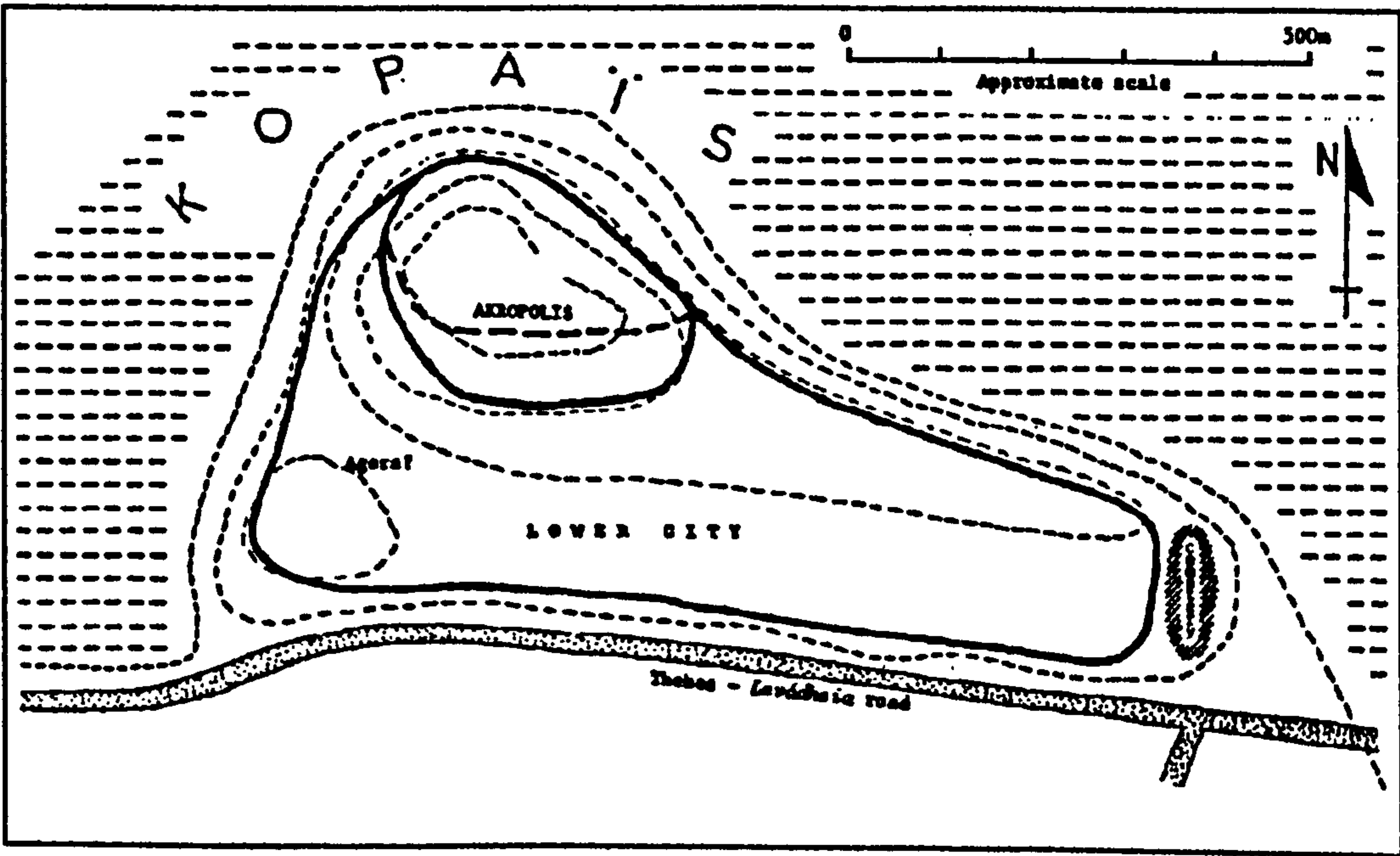


Figure 6: Haliartus (no. 88)
(after Fossey 1988)

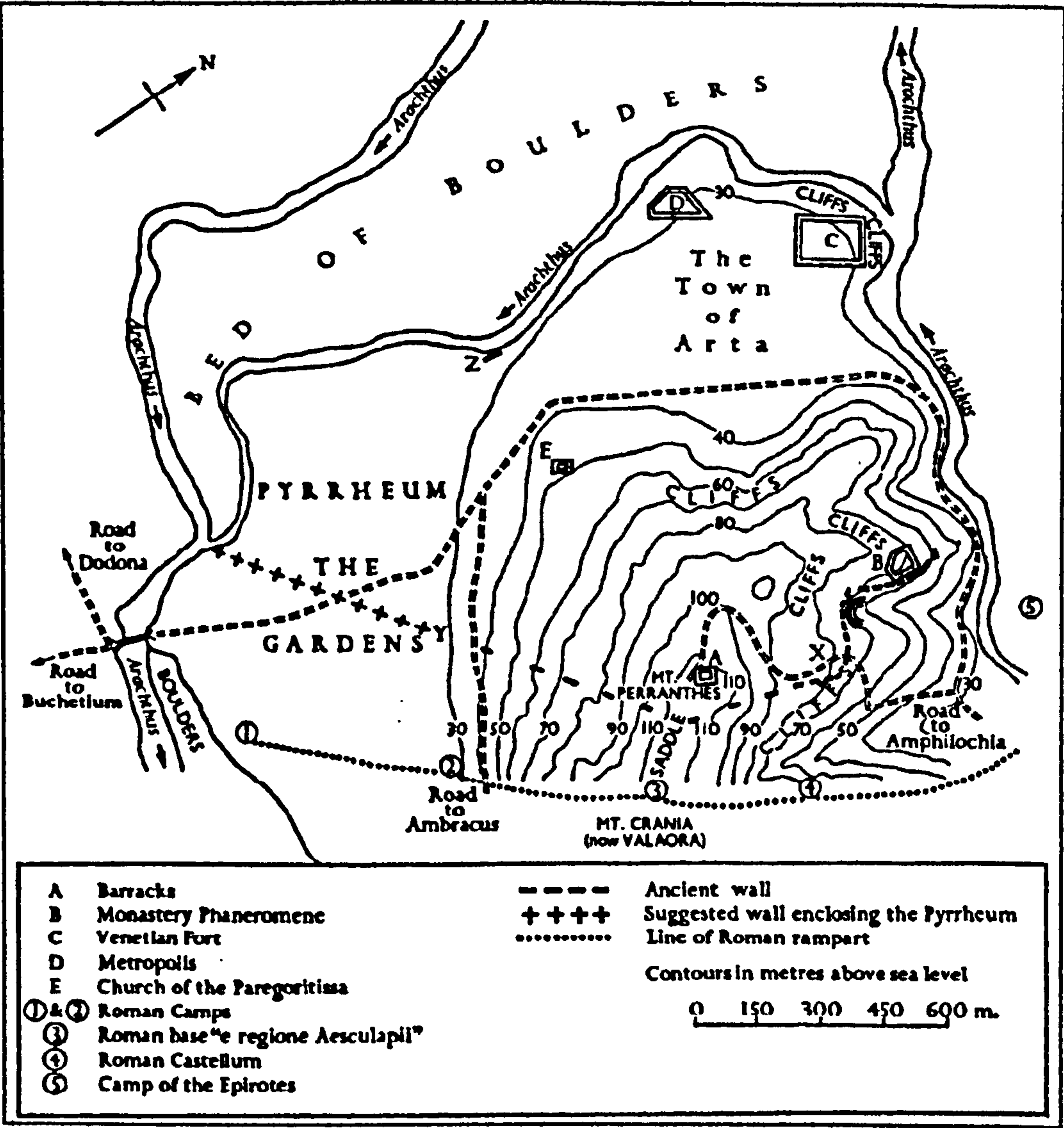


Figure 7: Ambracia (no. 83)
(after Hammond 1967)

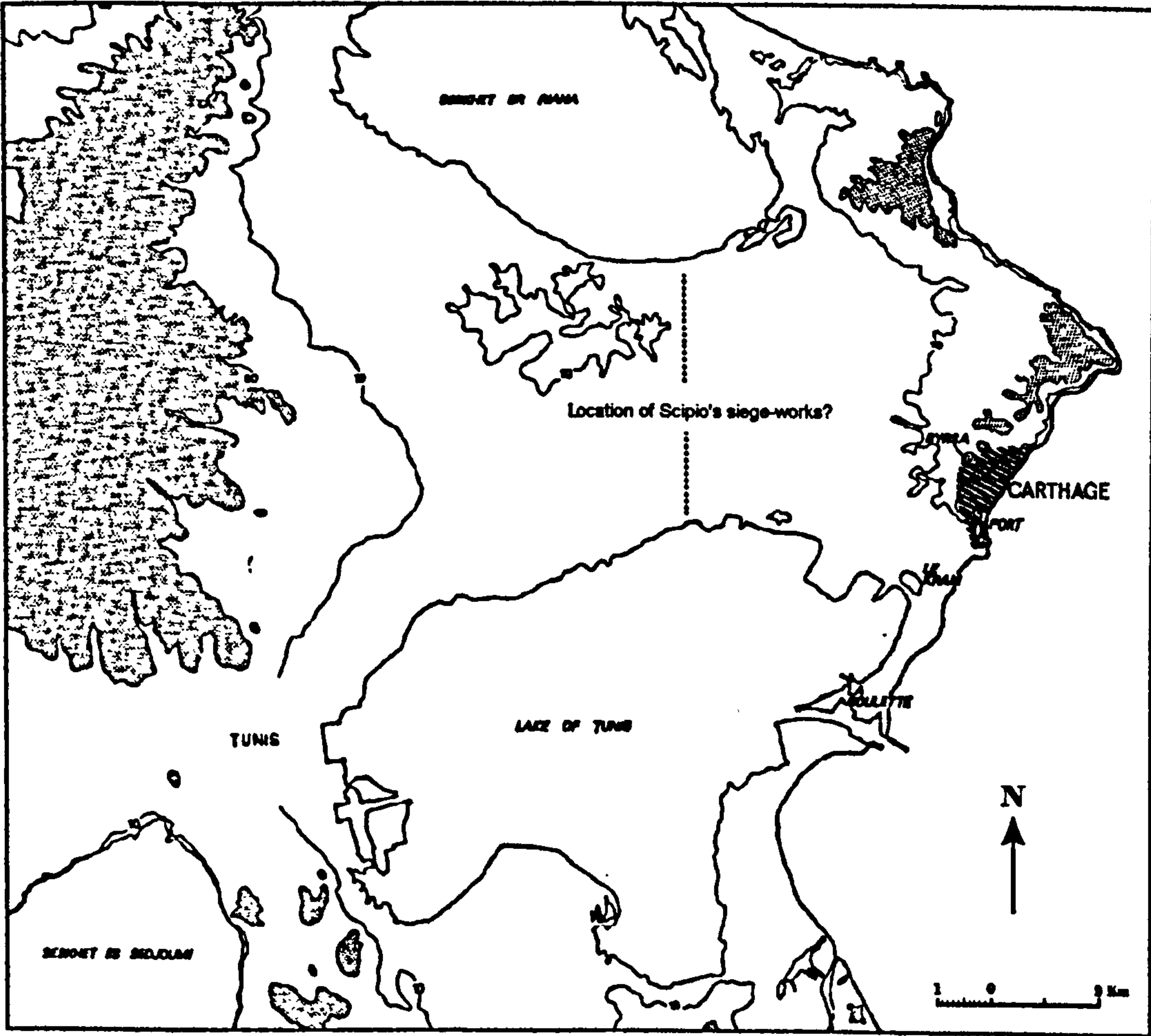


Figure 8: Carthage and environs (no. 95)
(after Hurst & Roskams 1984)

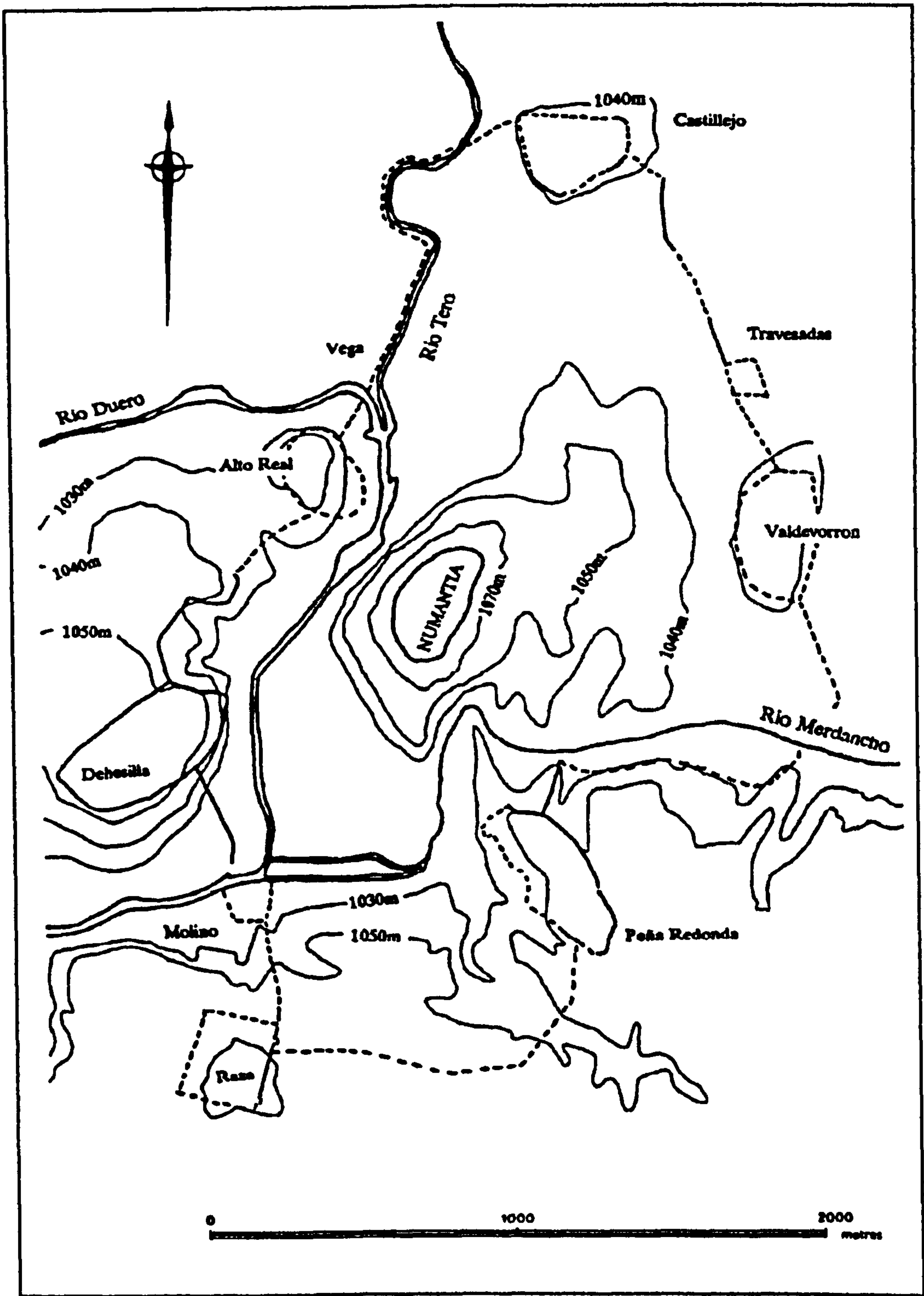


Figure 9: Numantia (nos. 98, 99 & 102)
(after Salvatore 1996)

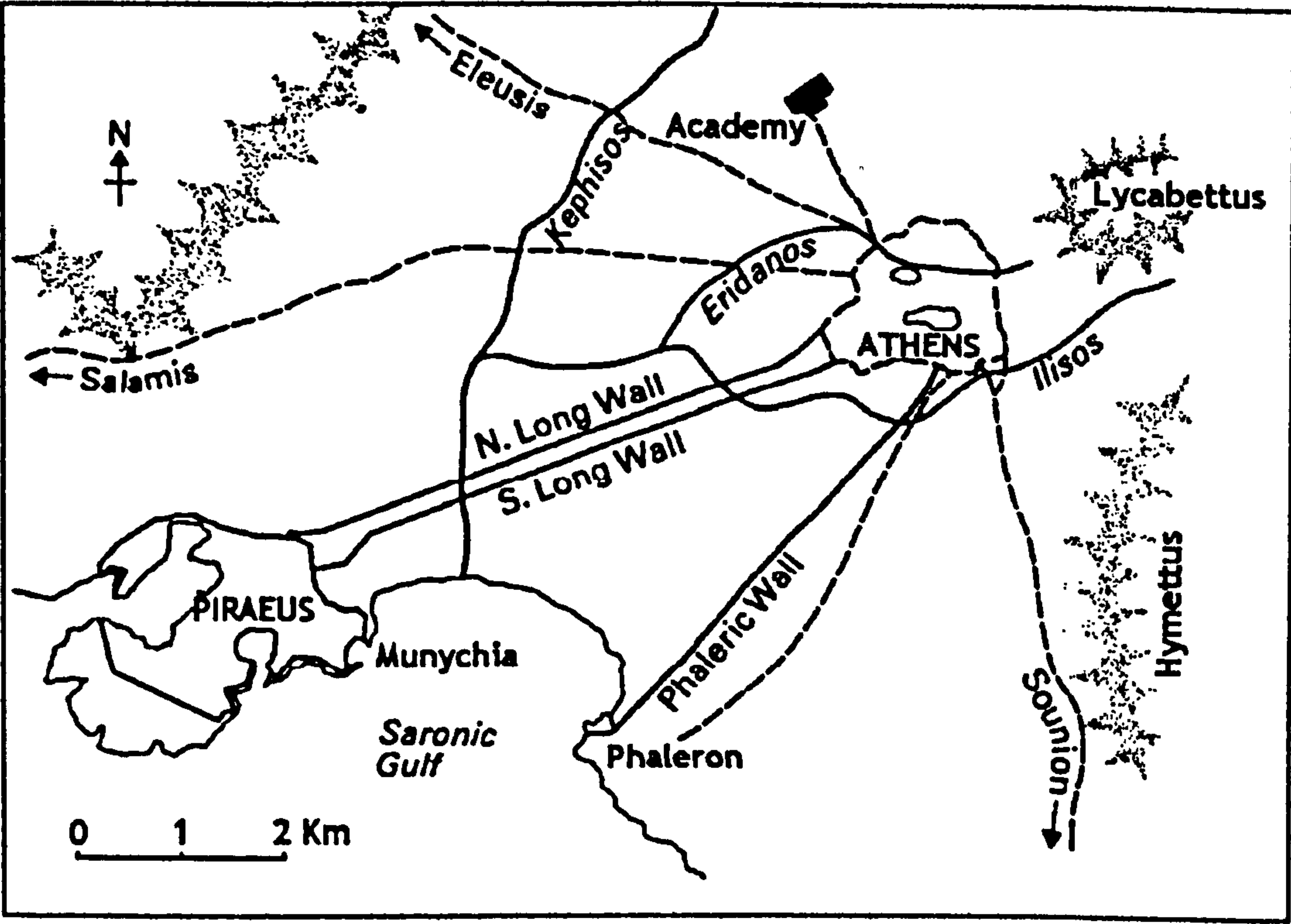


Figure 10: Athens and Piraeus (nos. 111–112)
(after Roberts 1984)

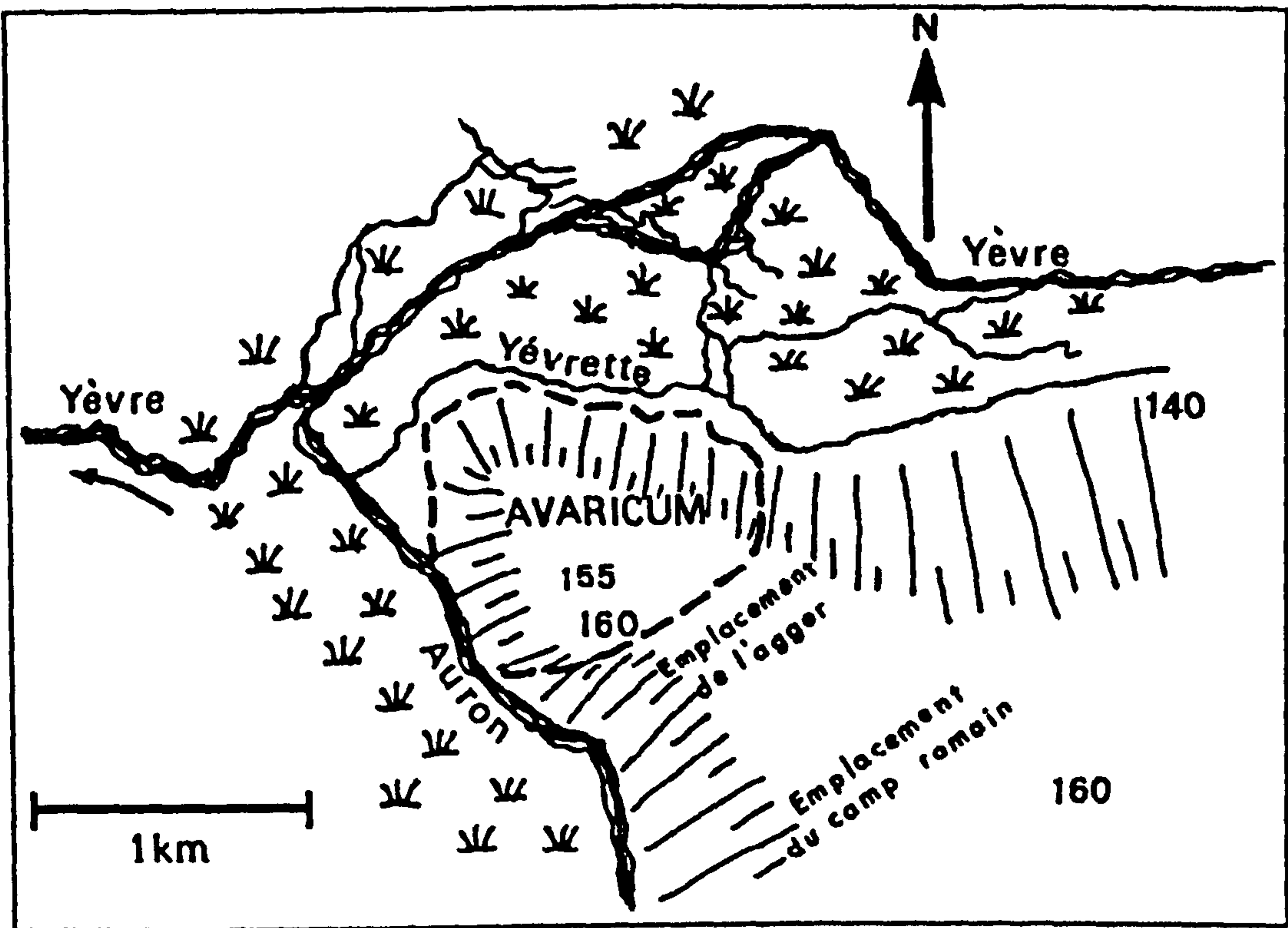


Figure 11: Avaricum (no. 132)
(after Harmand 1984)

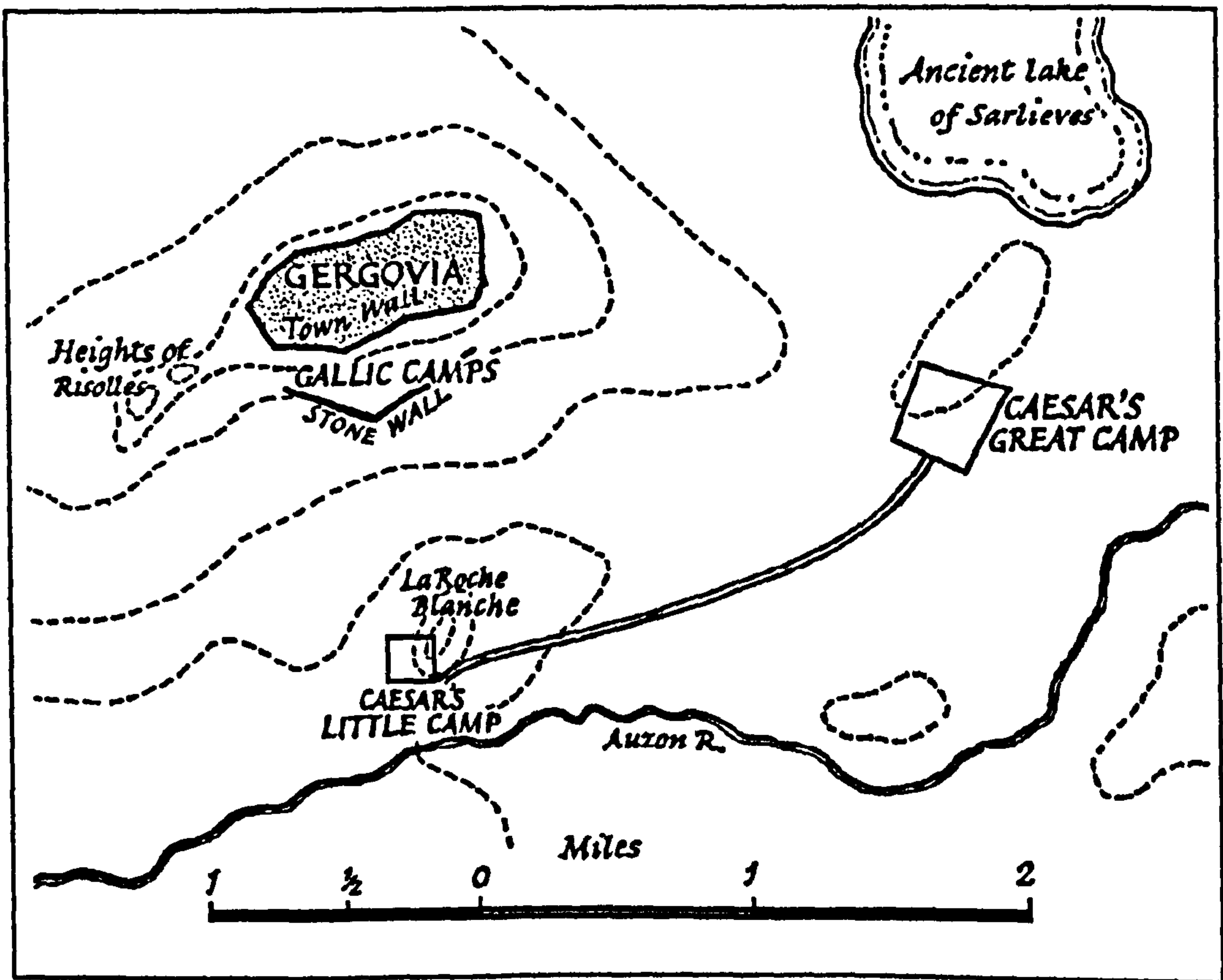


Figure 12: Gergovia (no. 133)
(after Fuller 1965)

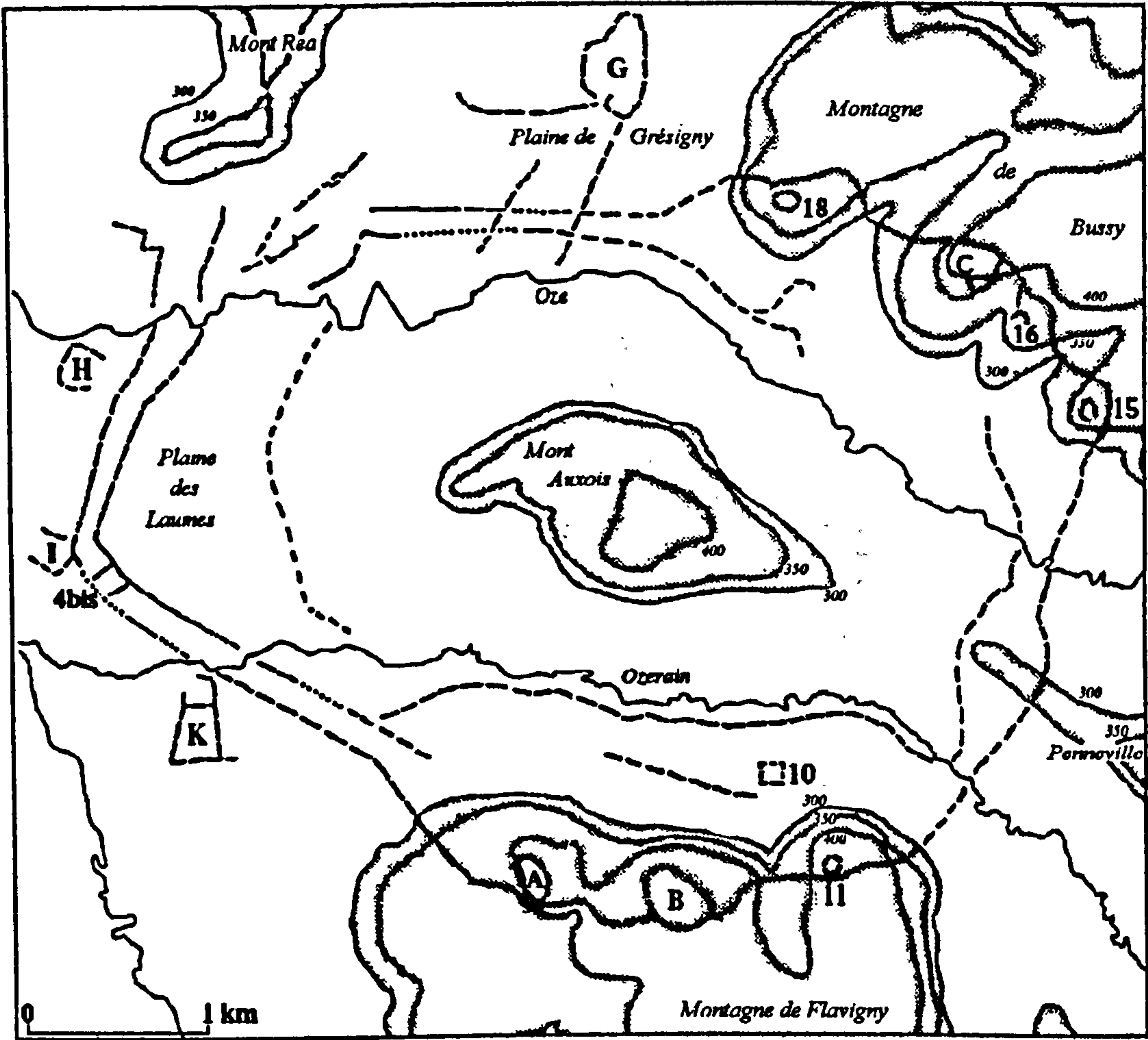


Figure 13: Alesia (no. 134)

(after Bénard 1996; the features labelled G, H, I, K, and 10 are no longer thought to be Roman)

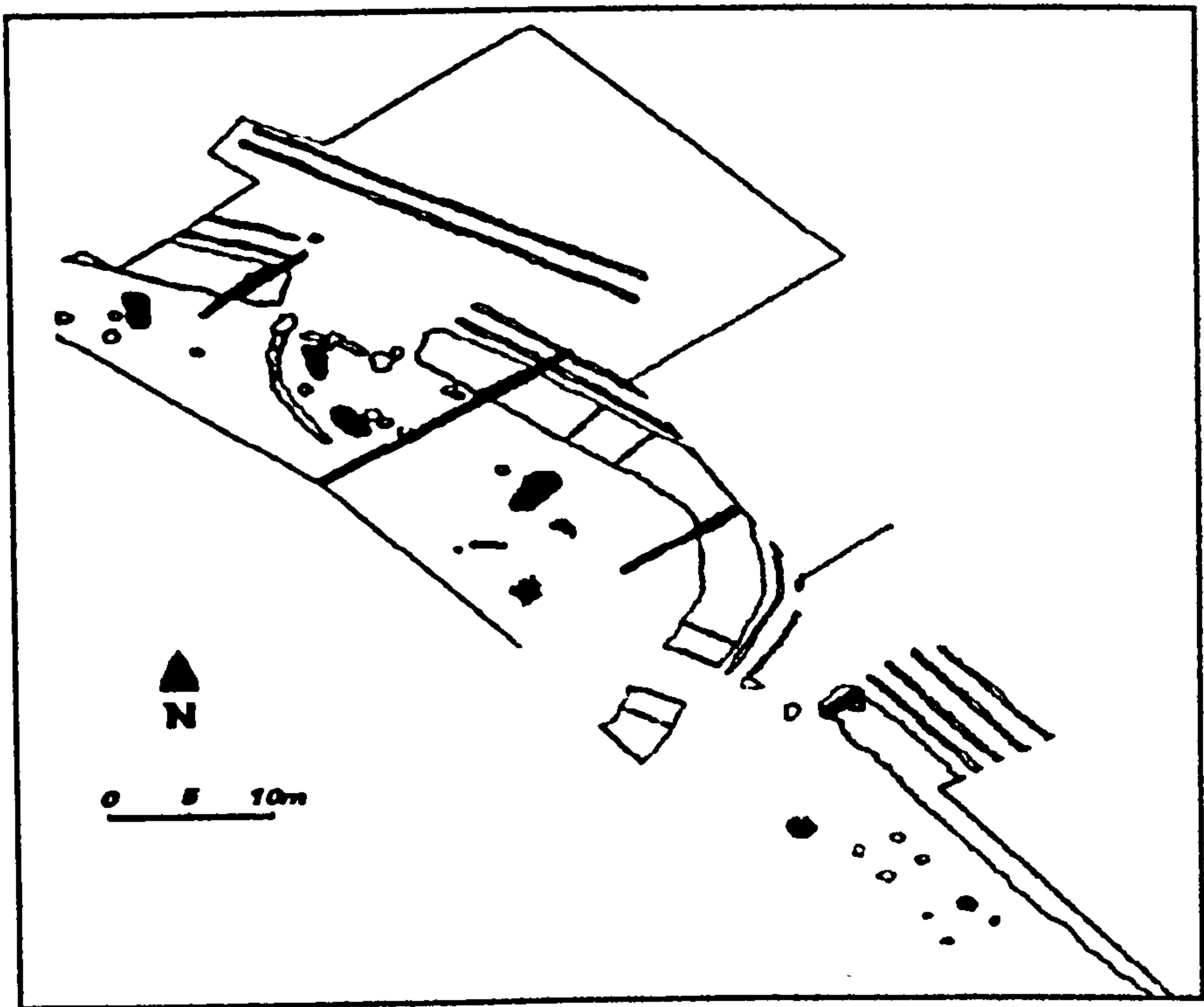


Figure 14a: Alesia: the circumvallation on the Montagne de Bussy at Camp C (after Bénard 1996)

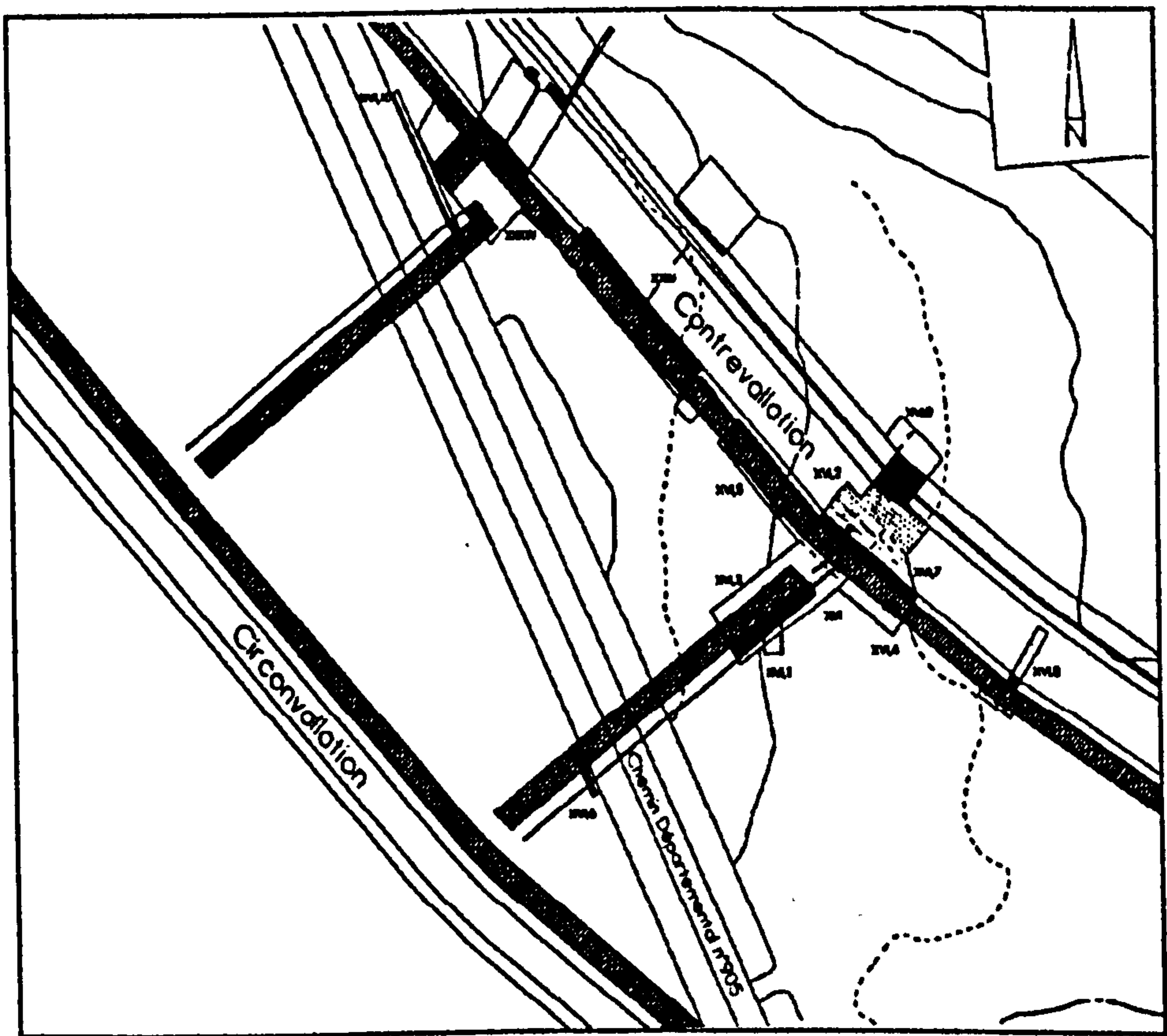


Figure 14b: Alesia: the circumvallation on the Plaine des Laumes at '4 bis' (after Bénard 1996)

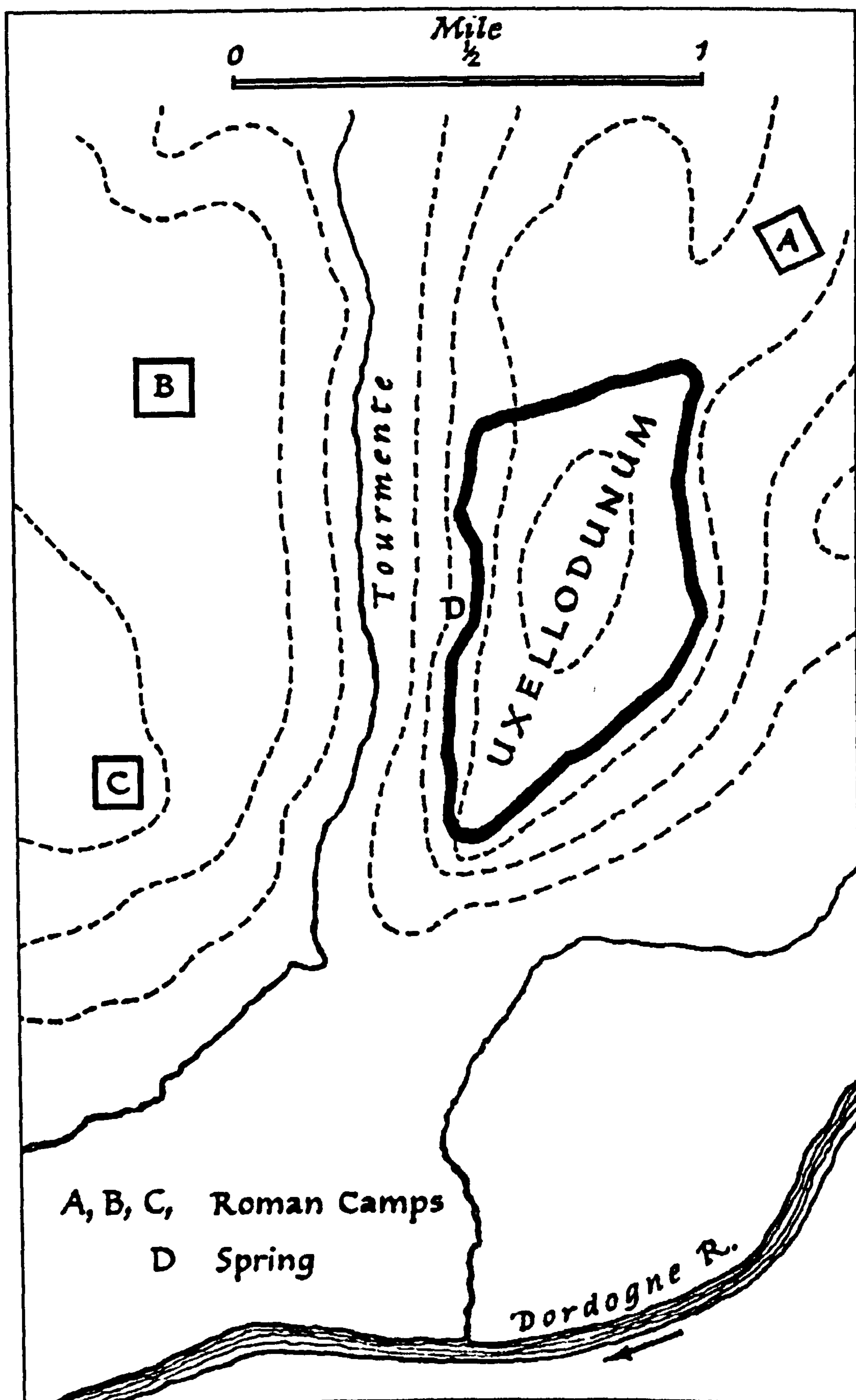


Figure 15: Uxellodunum (no. 135)

(after Fuller 1965; camp locations suggested on topographic grounds; no remains of circumvallation evident.)

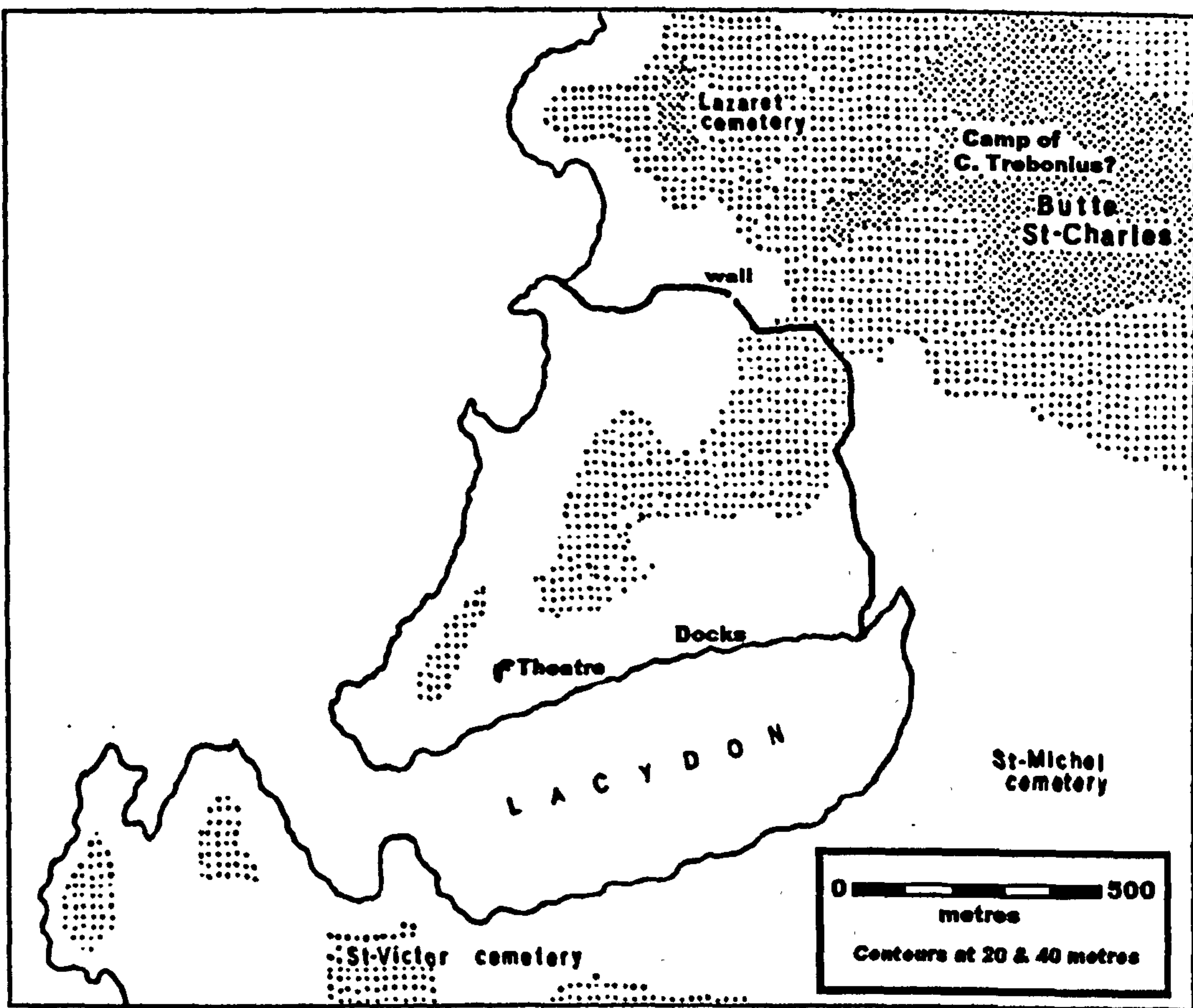


Figure 16: Massilia (no. 139)
(after Rivet 1988)

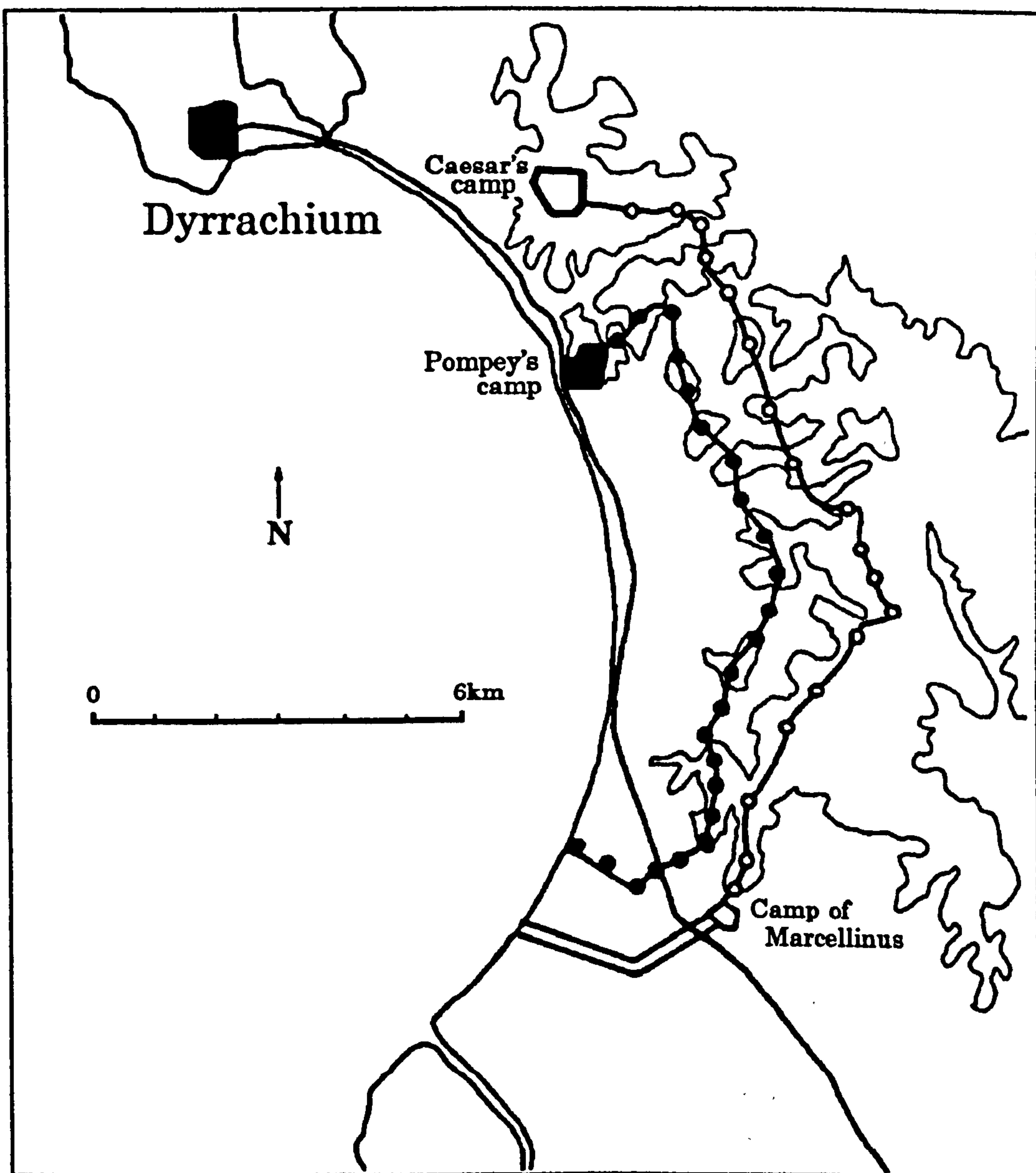


Figure 17: Dyrrachium (no. 143)

(after Veith 1906; camp locations suggested on topographic grounds; no remains of circumvallation evident.)

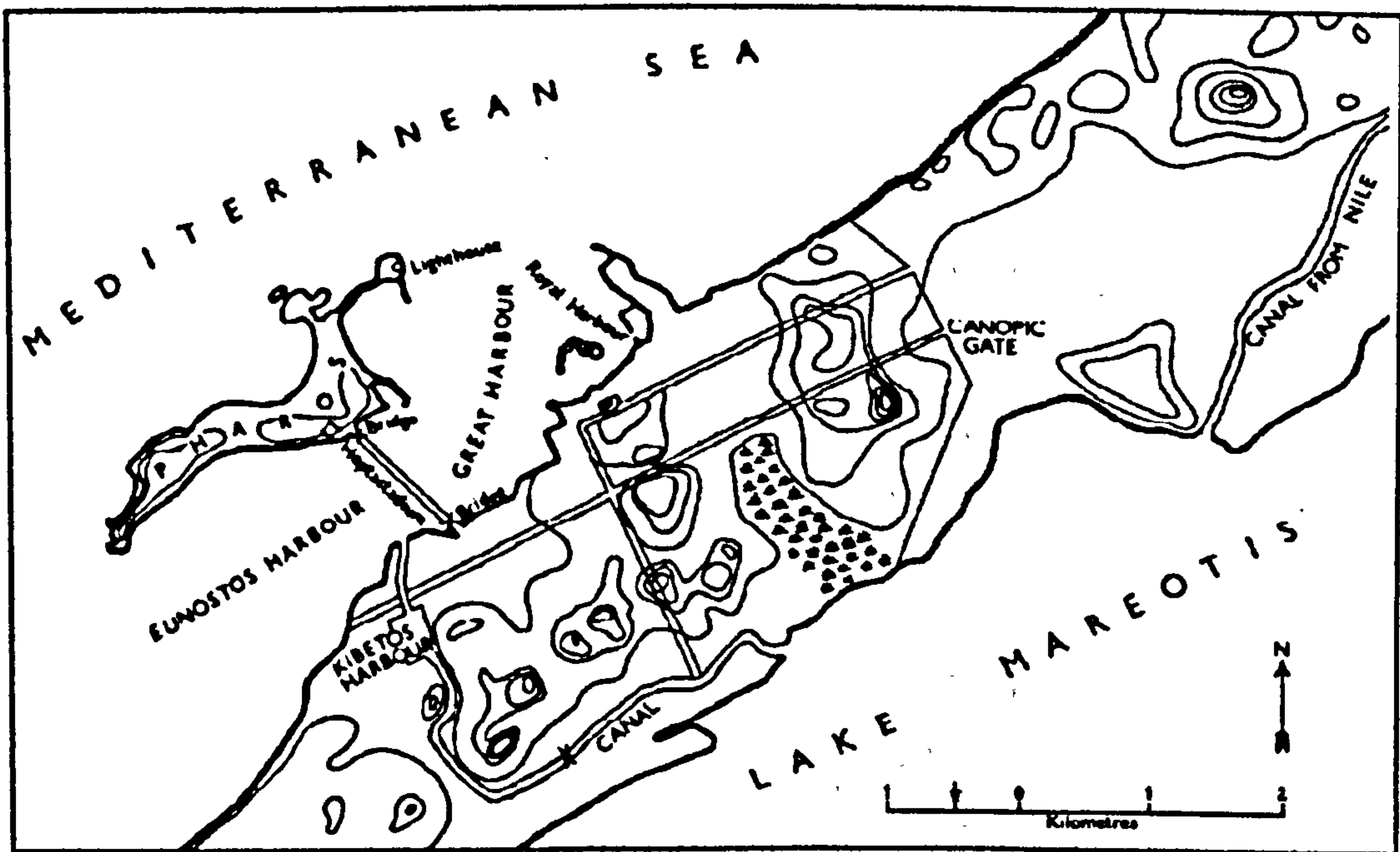


Figure 18: Alexandria (no. 145)
(after Townend 1988)

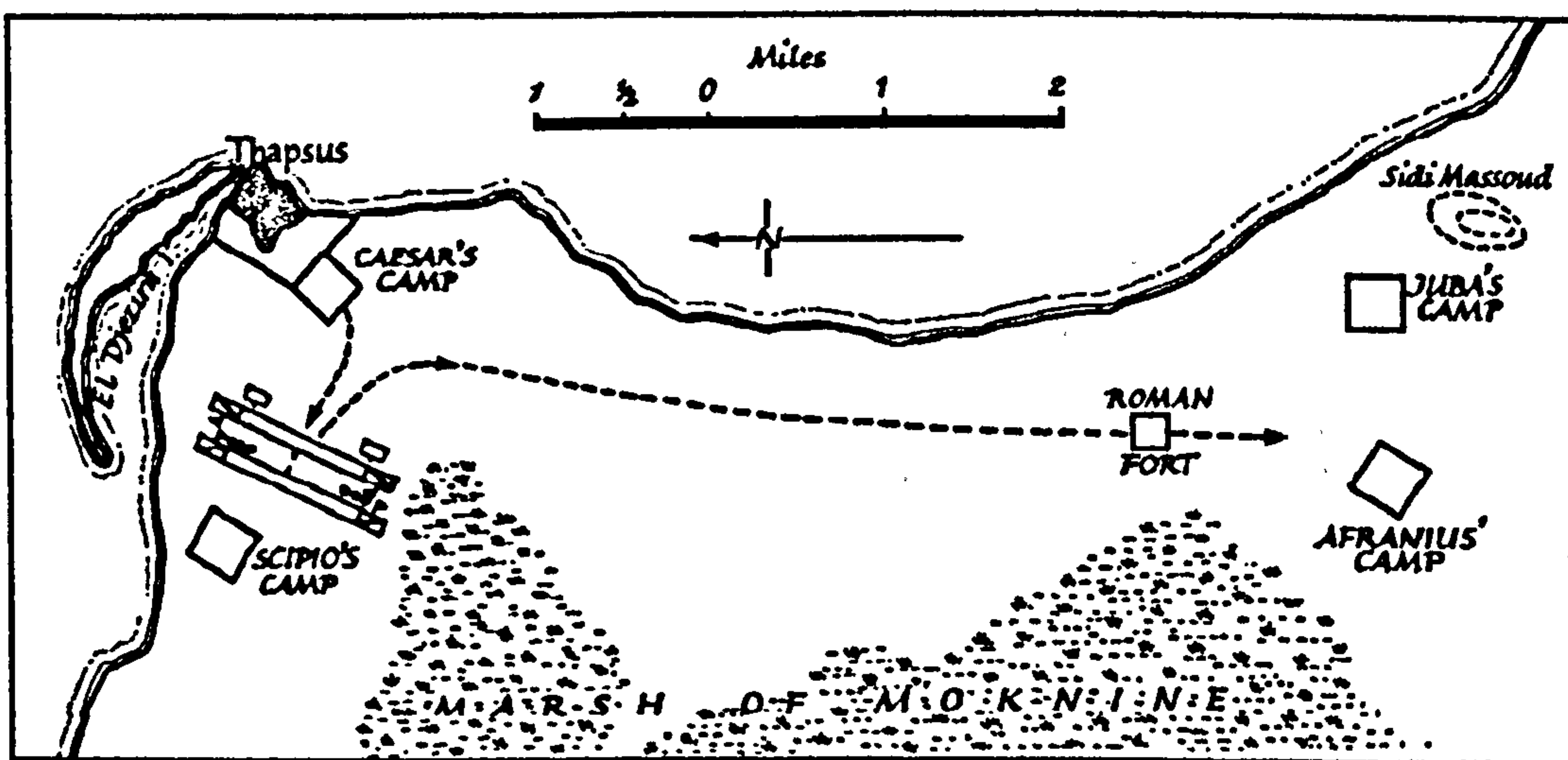


Figure 19: Thapsus (no. 147)
(after Fuller 1965; camp locations suggested on topographic grounds; no remains of circumvallation evident.)

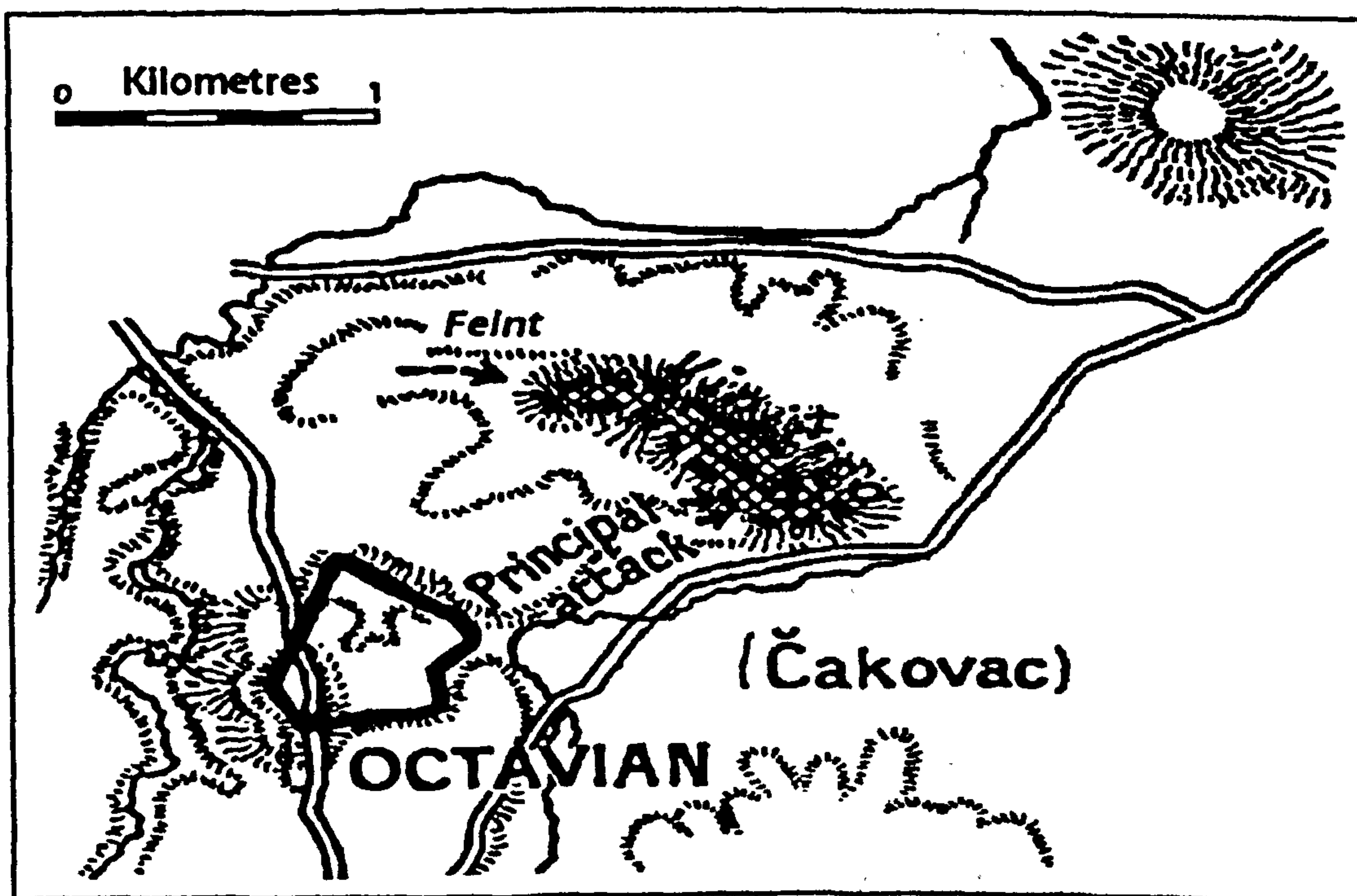


Figure 20: Metulum (no. 161)

(after Holmes 1928; camp location suggested on topographic grounds.)

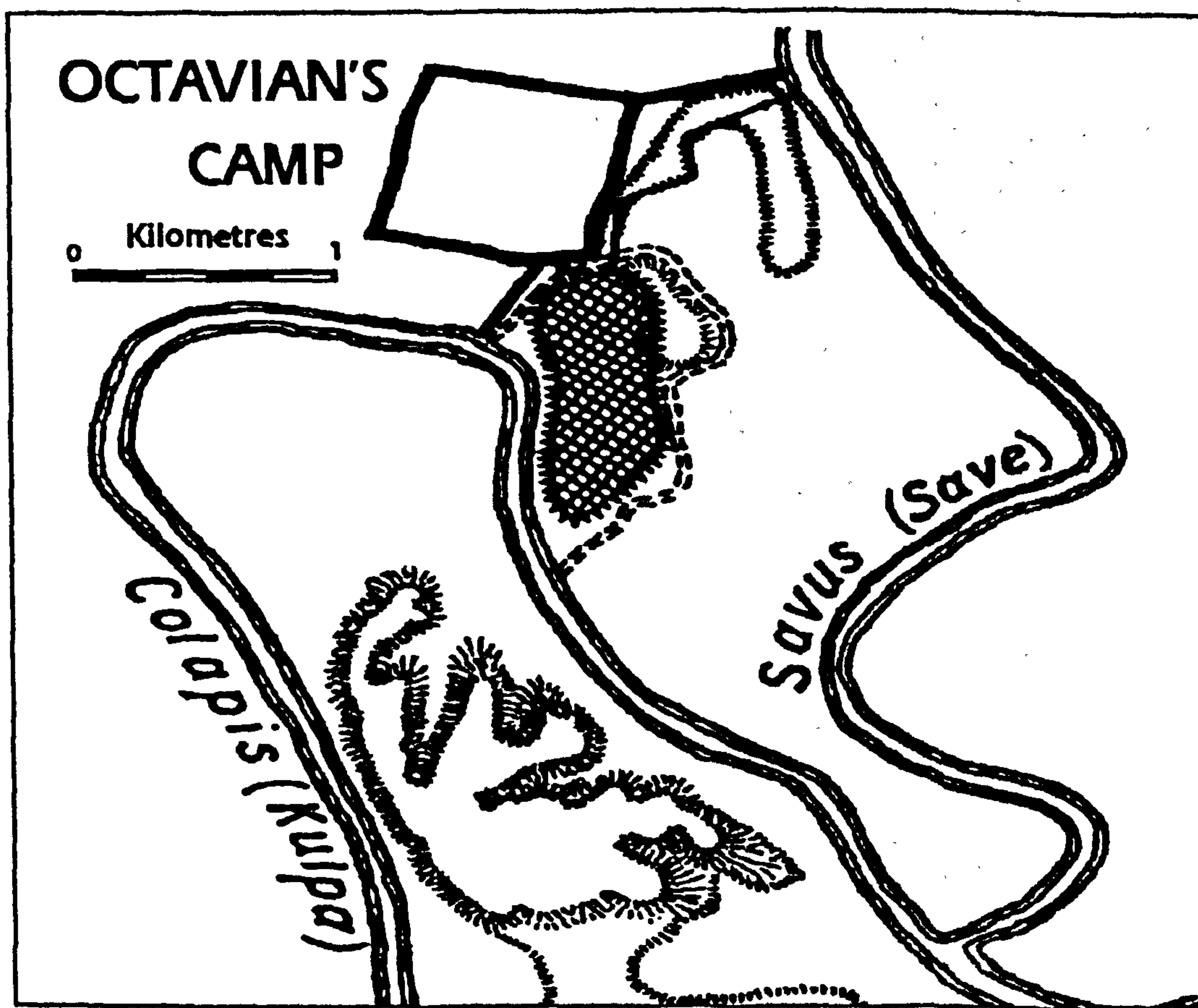


Figure 21: Siscia (no. 163)

(after Holmes 1928; camp location suggested on topographic grounds)

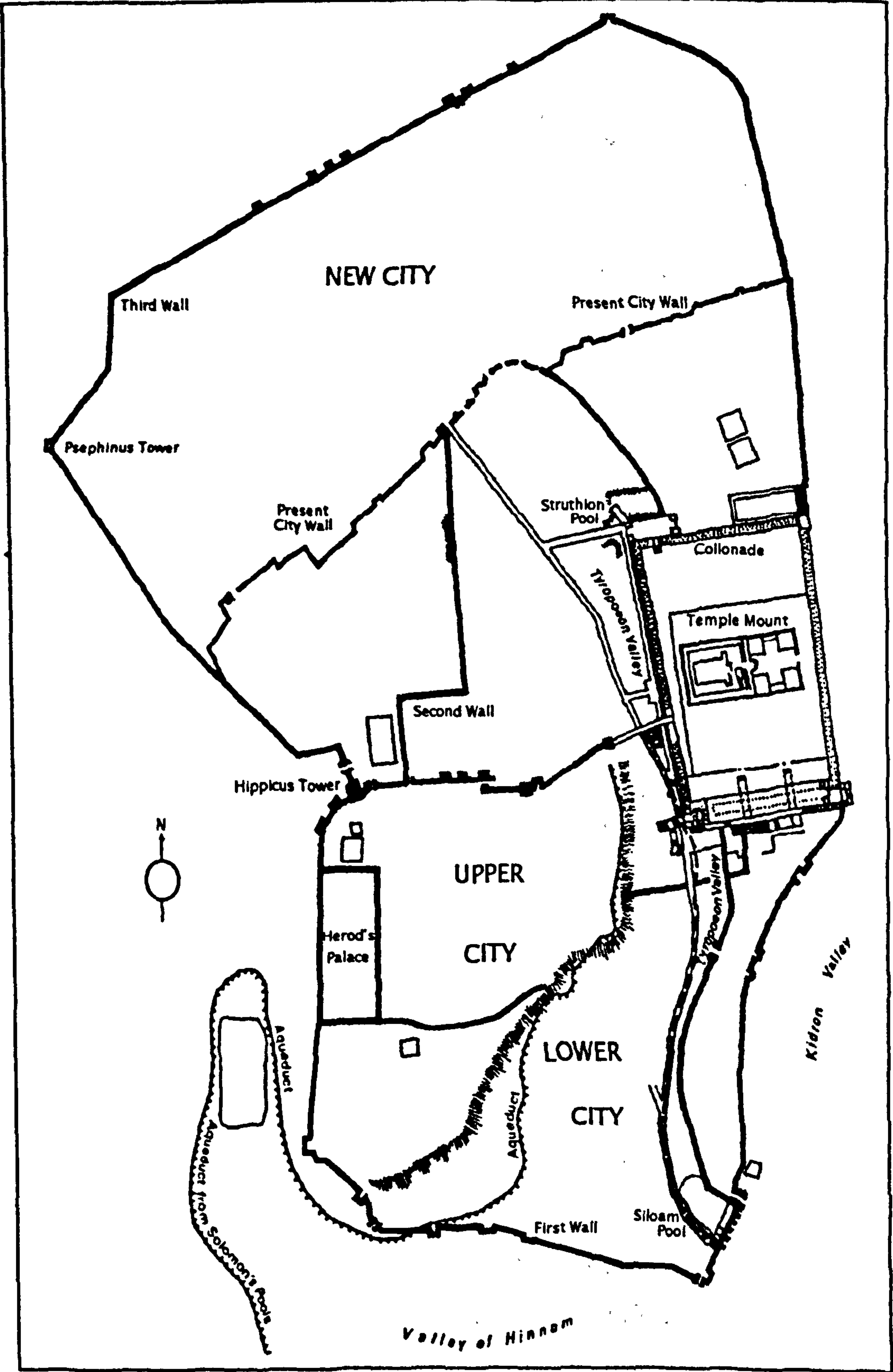


Figure 22: Jerusalem (nos. 122, 159, 176 & 189)
(after Price 1992)

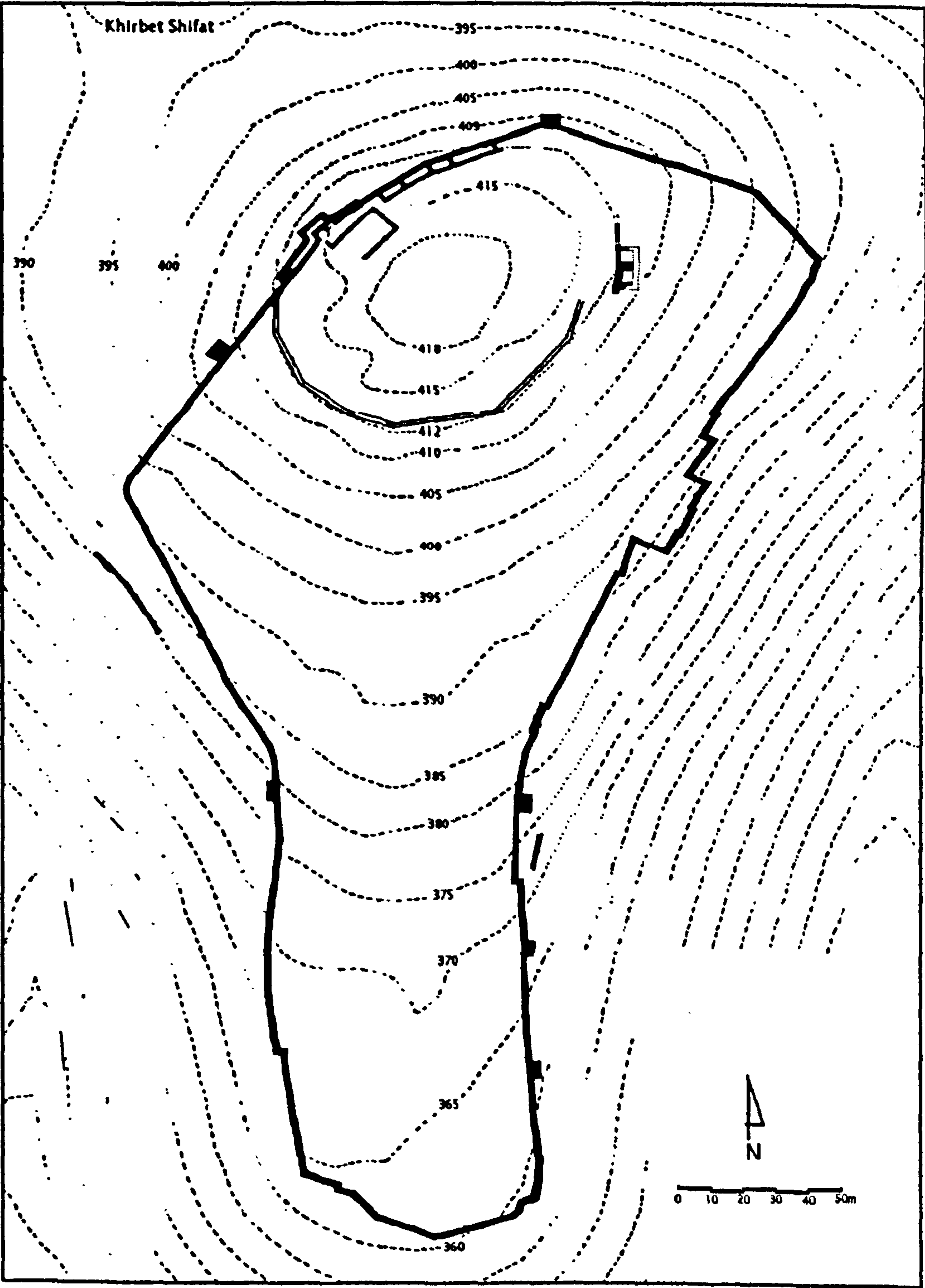


Figure 23: Jotapata (Yodefata) (no. 180)
(after Adan-Bayewitz & Aviam 1997)

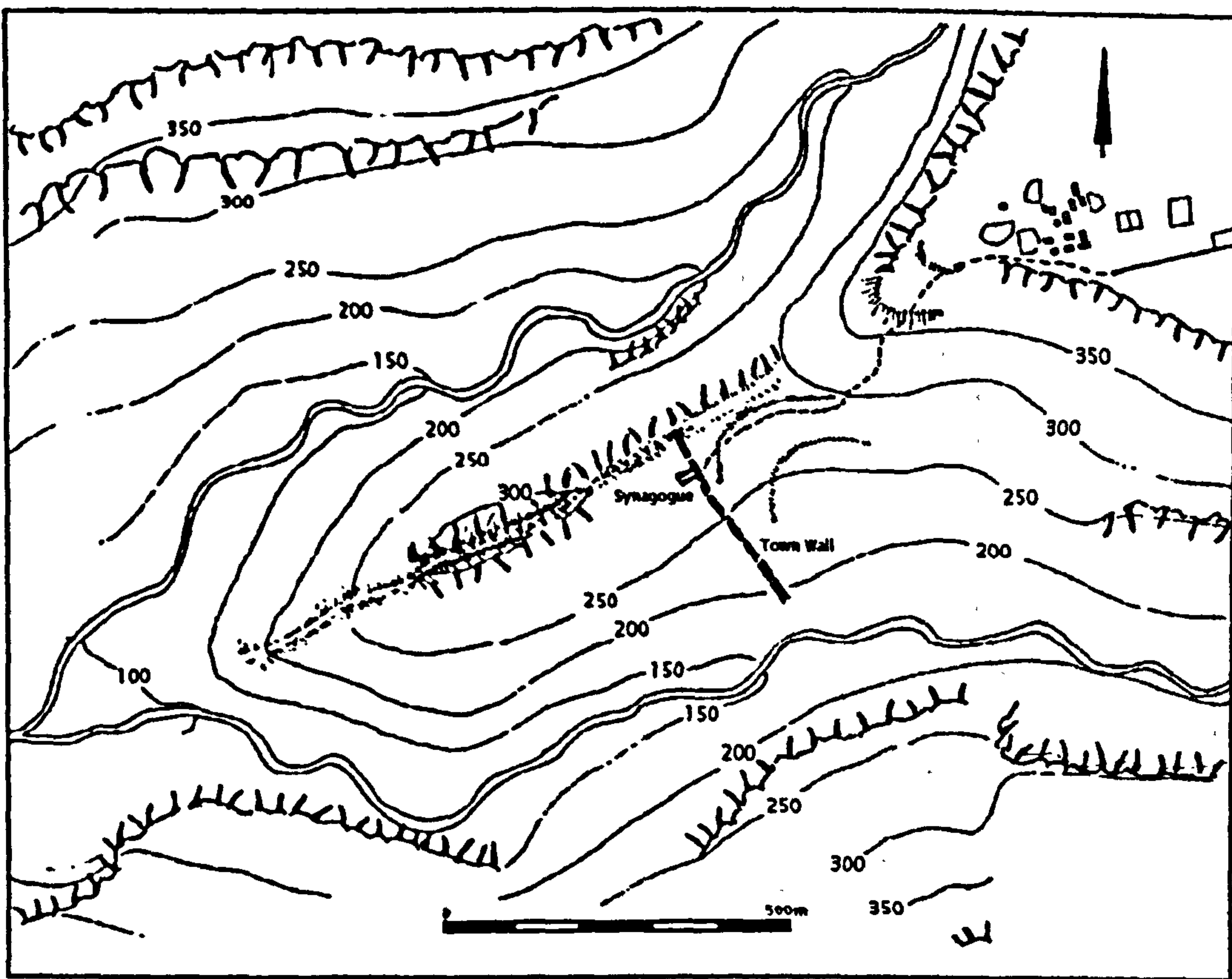


Figure 24: Gamala (no. 183)
(after Gutman 1981)

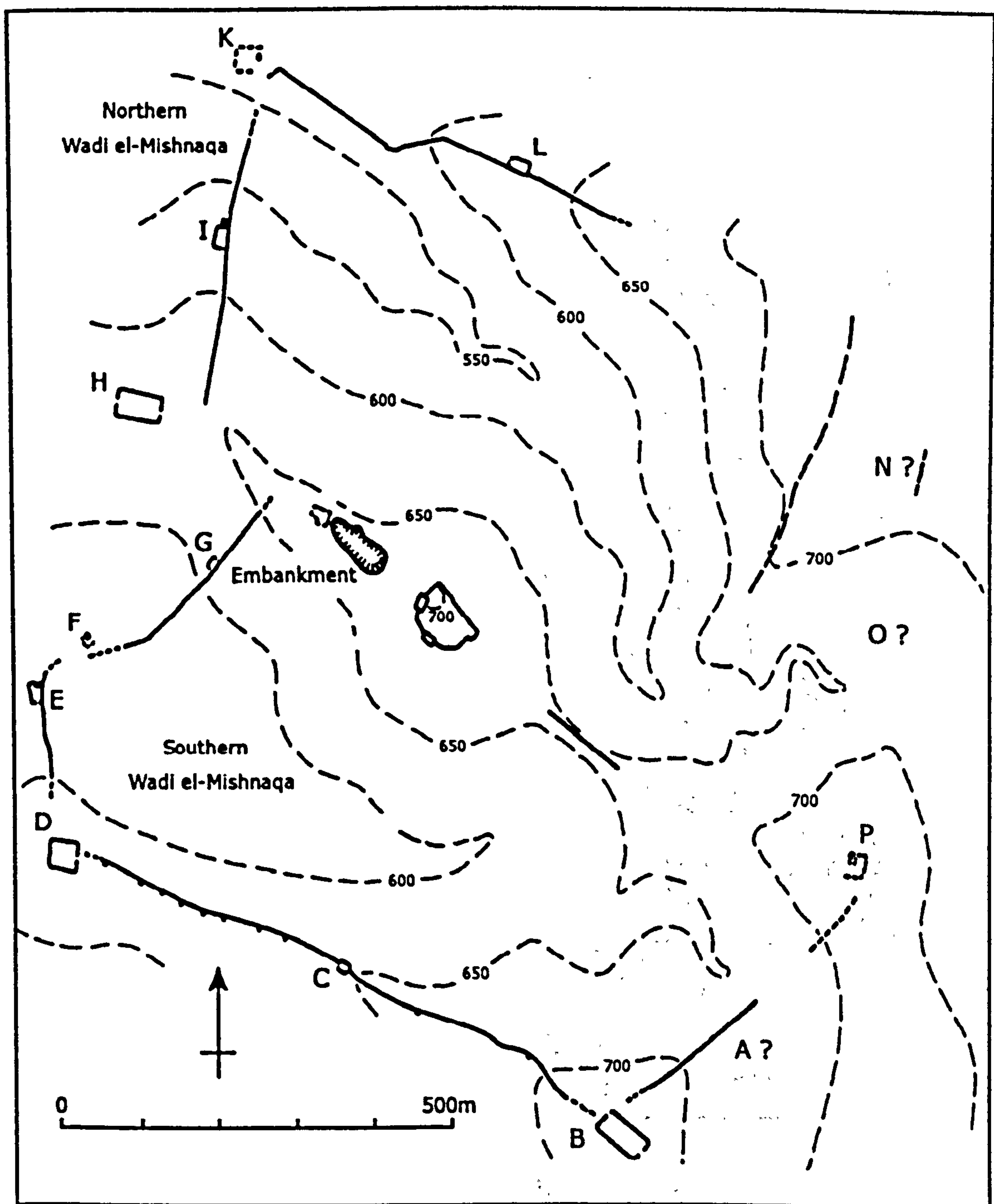


Figure 25: Machaerus (no. 190)

(after Kennedy & Riley 1990; the NE sector, represented by a broken line, was not surveyed on the ground, but is visible from the air)

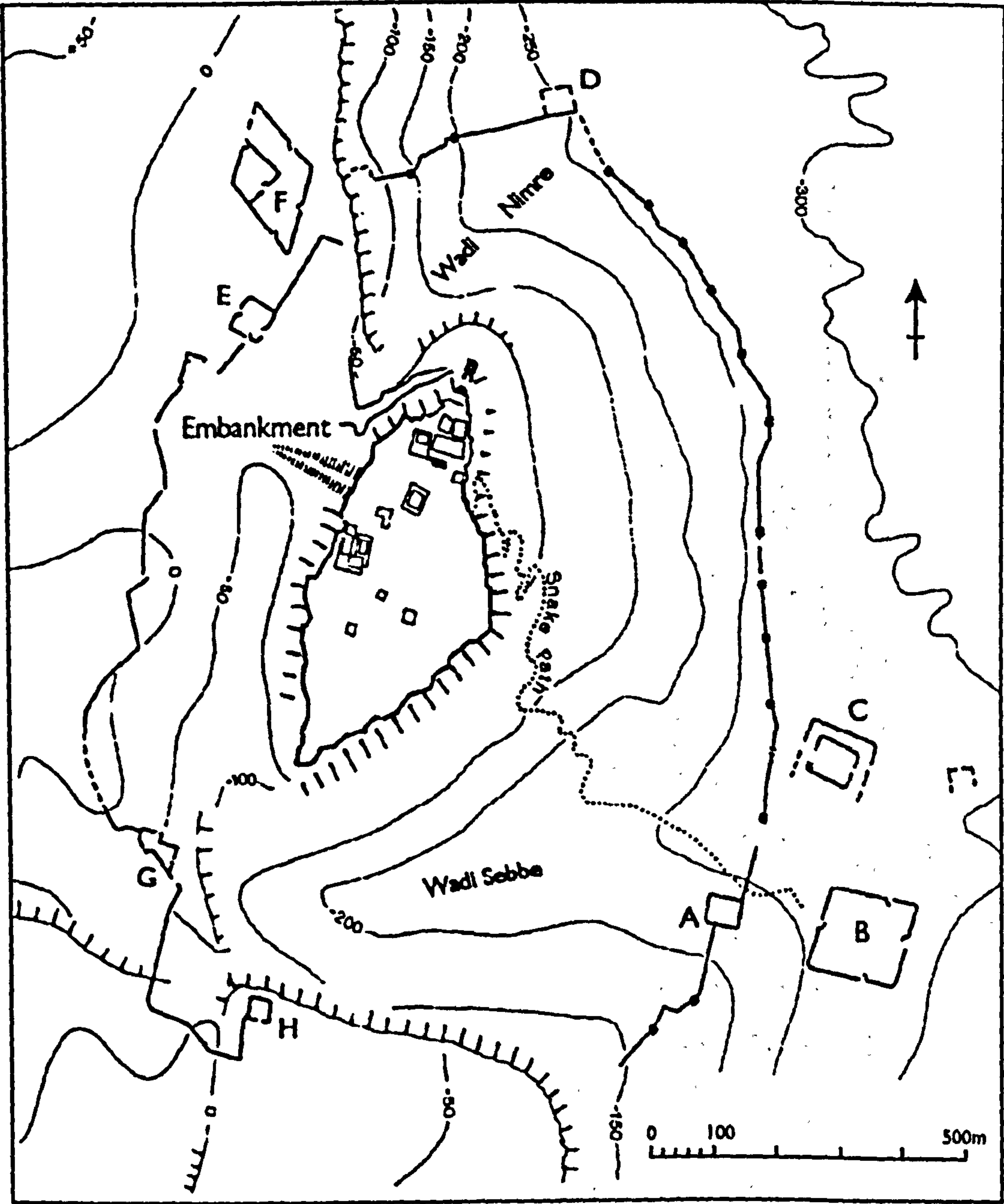


Figure 26: Masada (no. 191)
(after Richmond 1962)

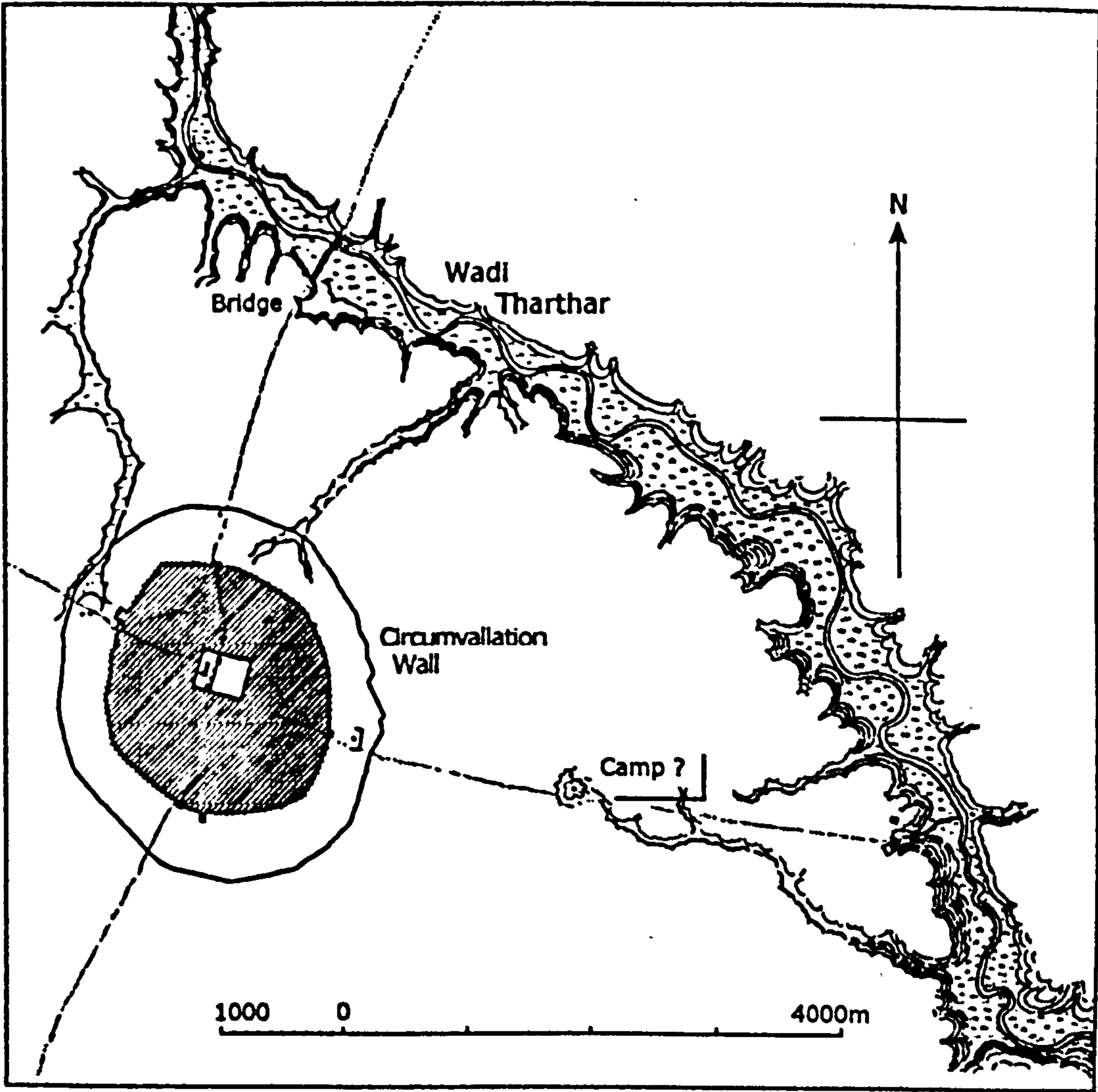


Figure 27a: Hatra and environs (nos. 196 & 201–202)
(after Andrae 1912)

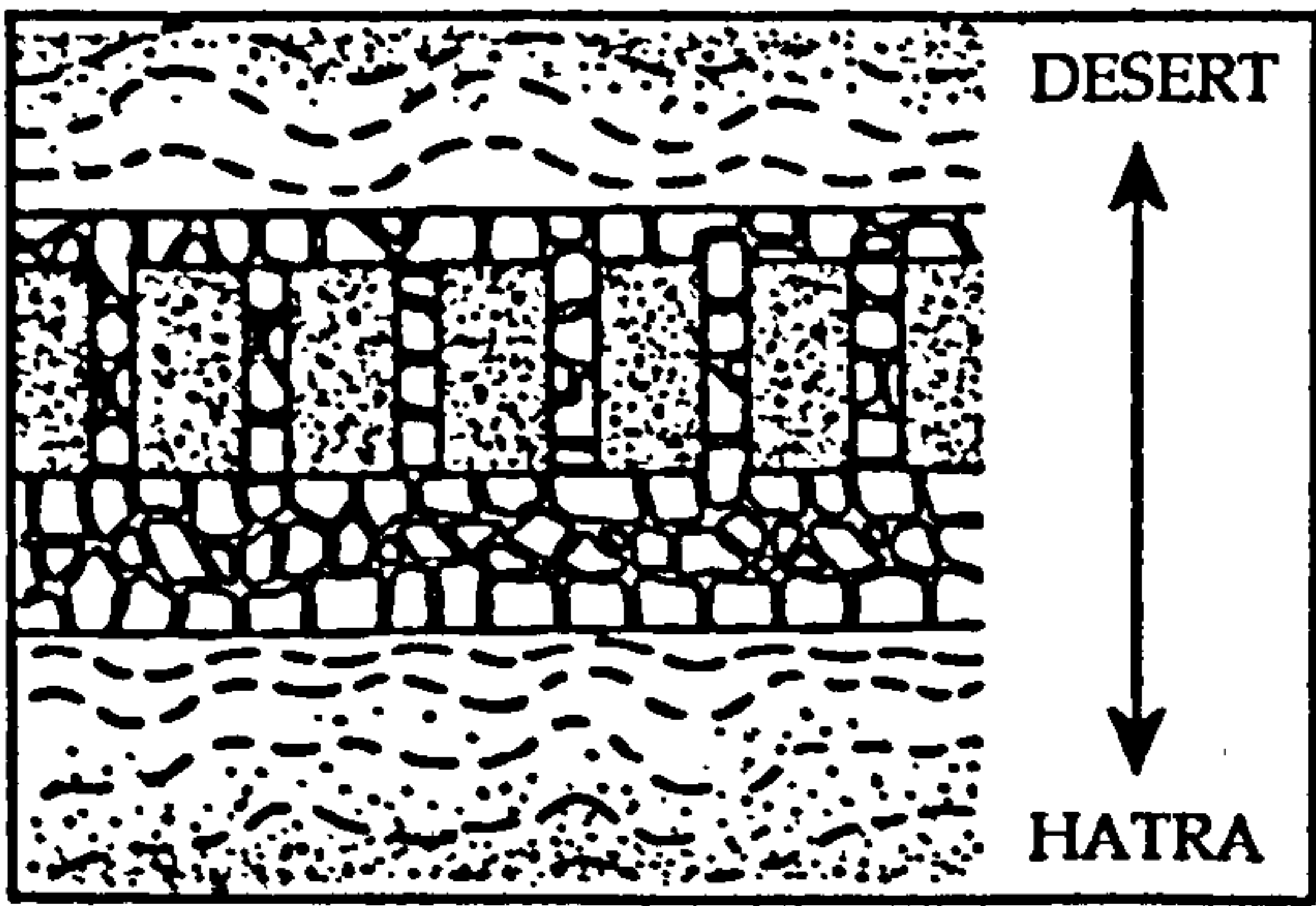


Figure 27b: Hatra: circumvallation wall (after Andrae 1912)

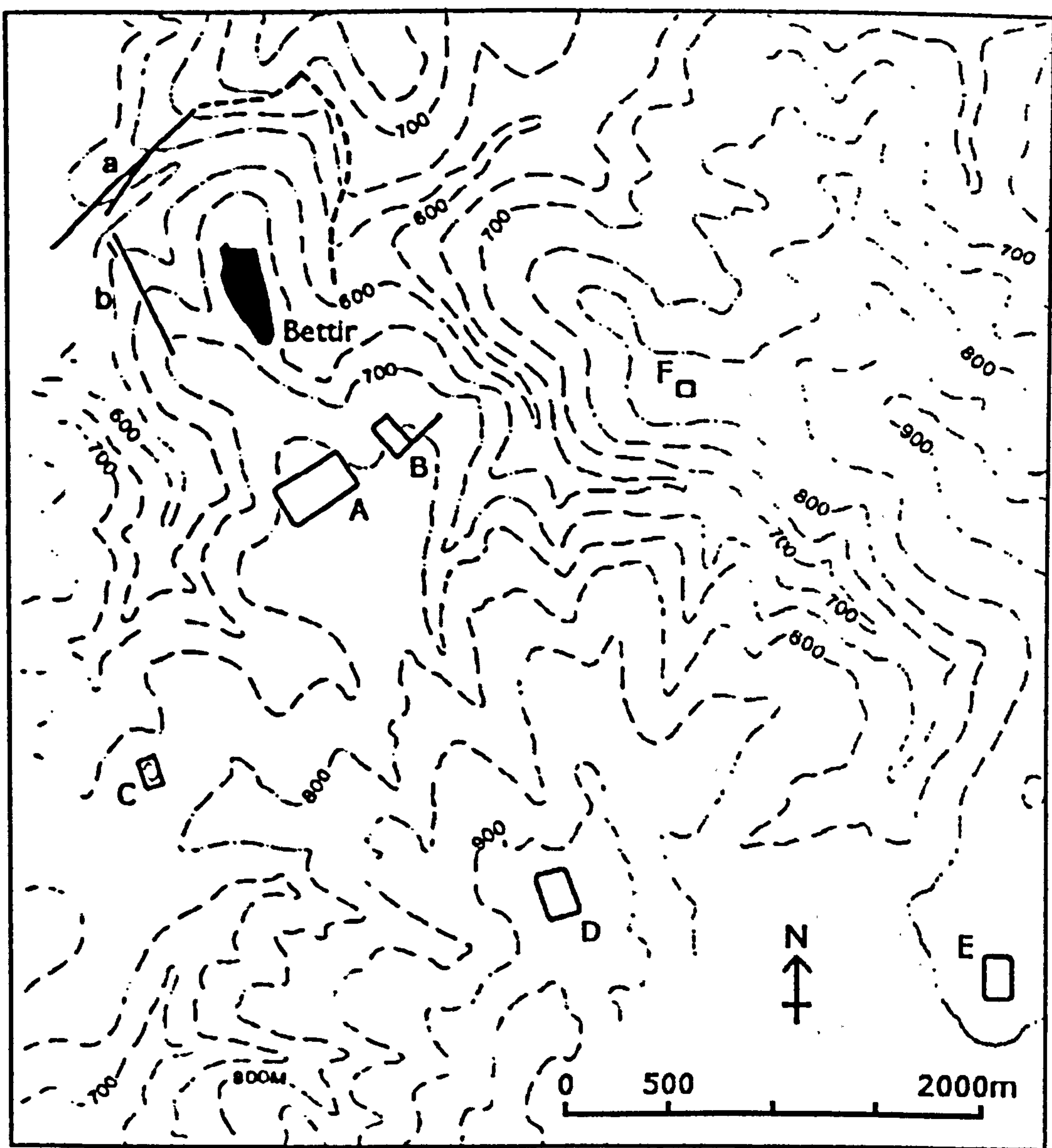


Figure 28: Bettir (no. 197)

(after Schulten 1933 and Kennedy & Riley 1990)

Stretches surveyed by Schulten, but invisible from the air, are shown as dashed lines.

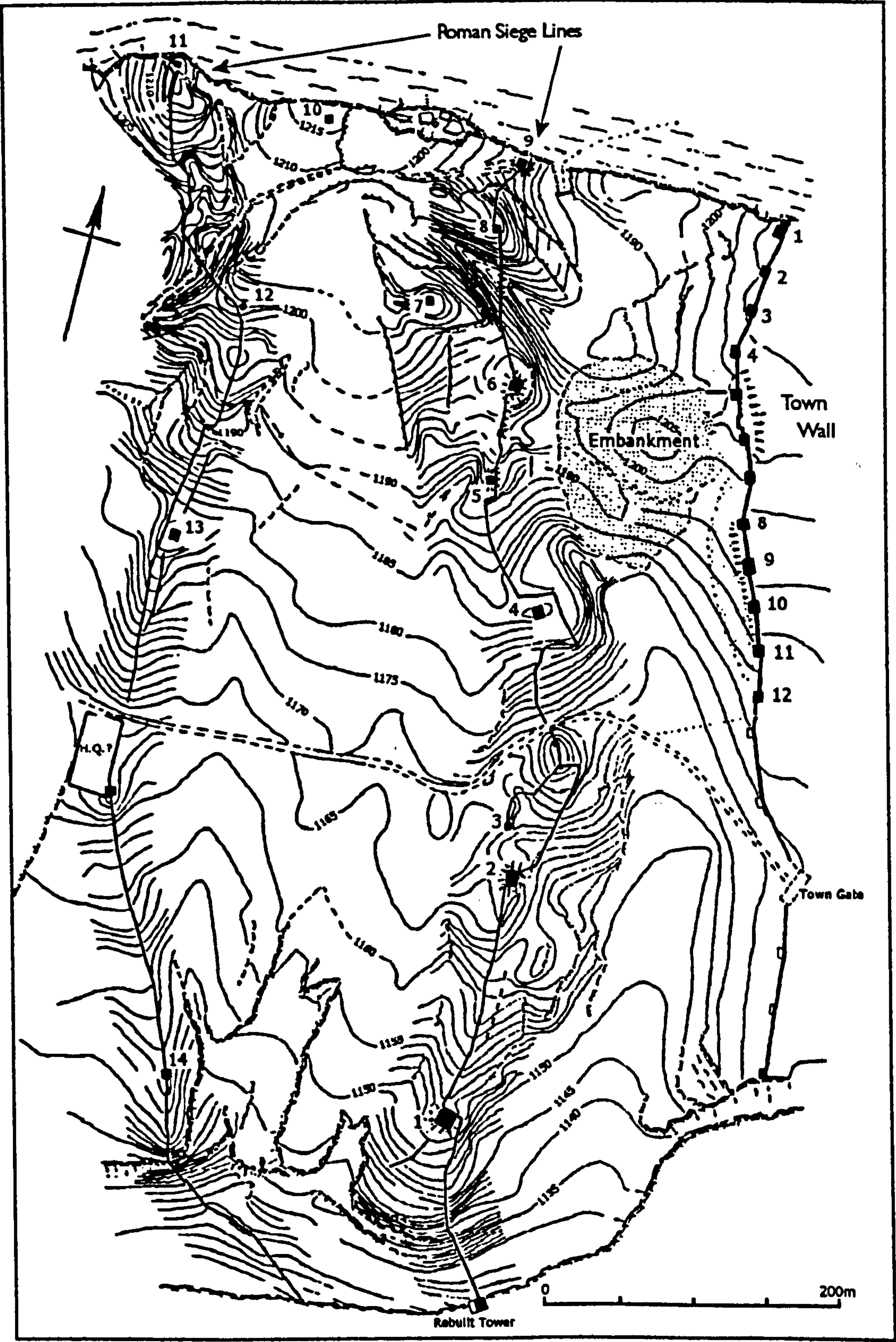


Figure 29: Cremna (no. 210)
(after Mitchell 1995)

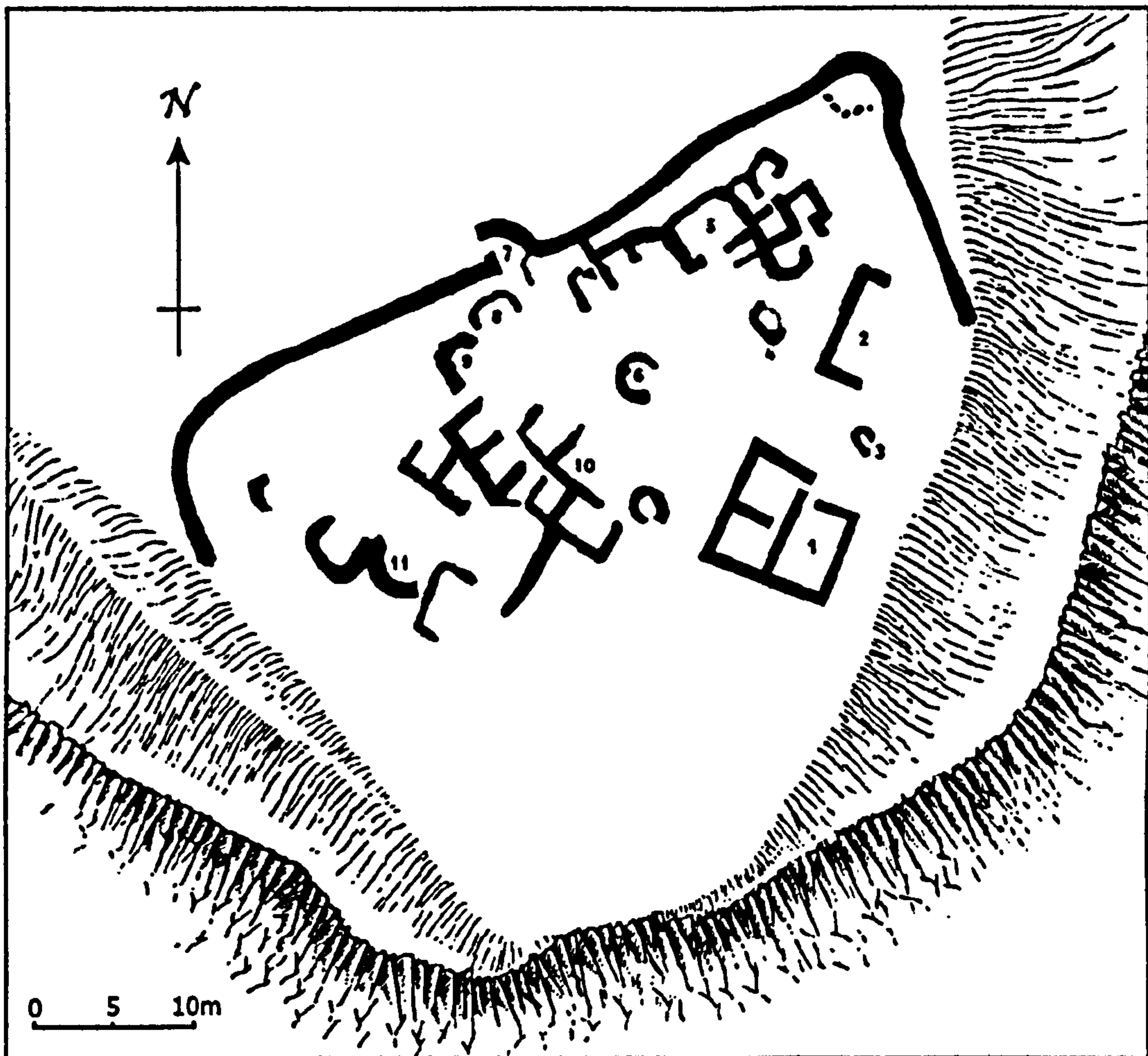


Figure 30: Nahal Hever, North camp (cf. pp. 89f.)
(after Yadin 1963)

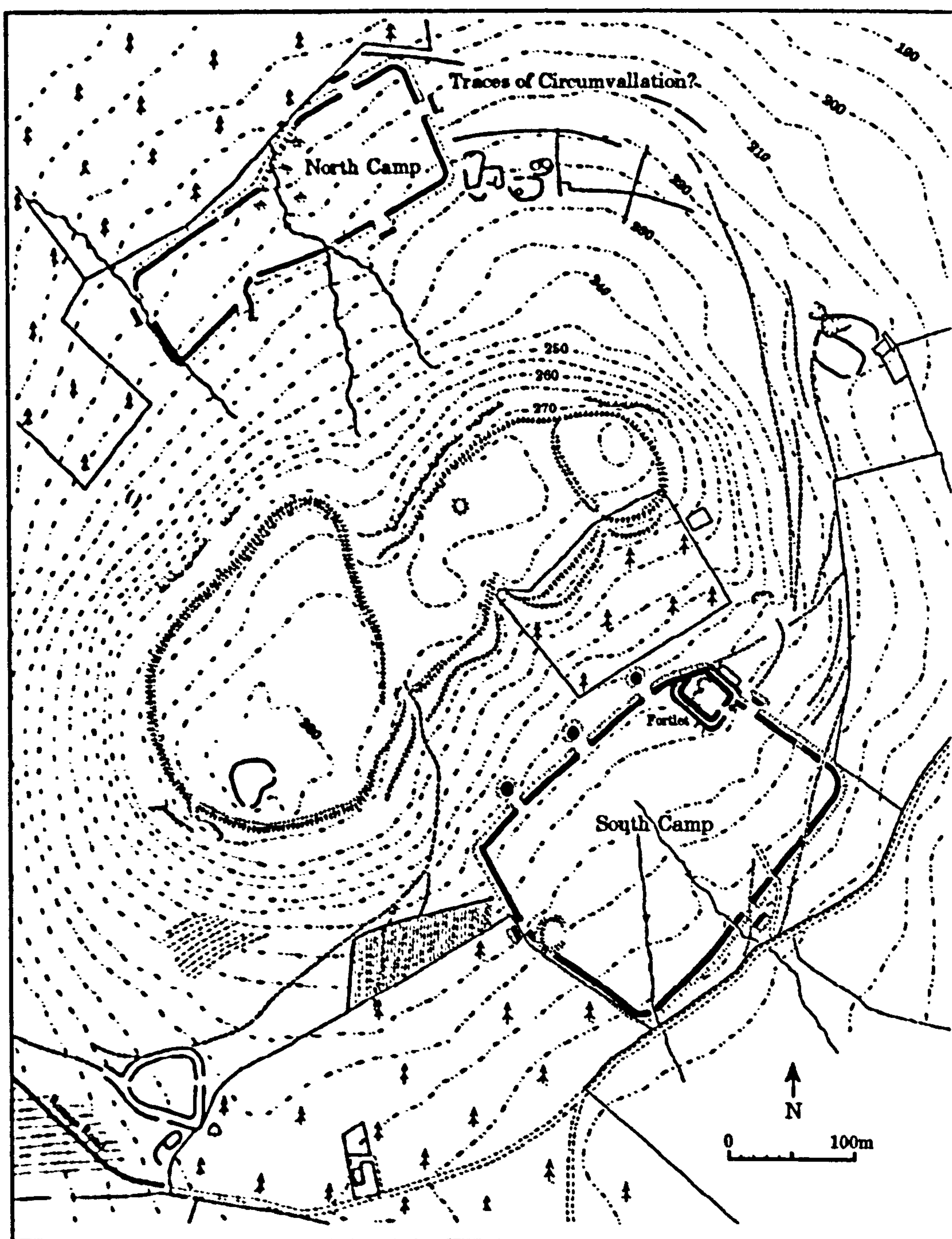


Figure 31: Burnswark (cf. pp. 90ff. & 127ff.)
(after R.C.A.H.M.S. 1997)

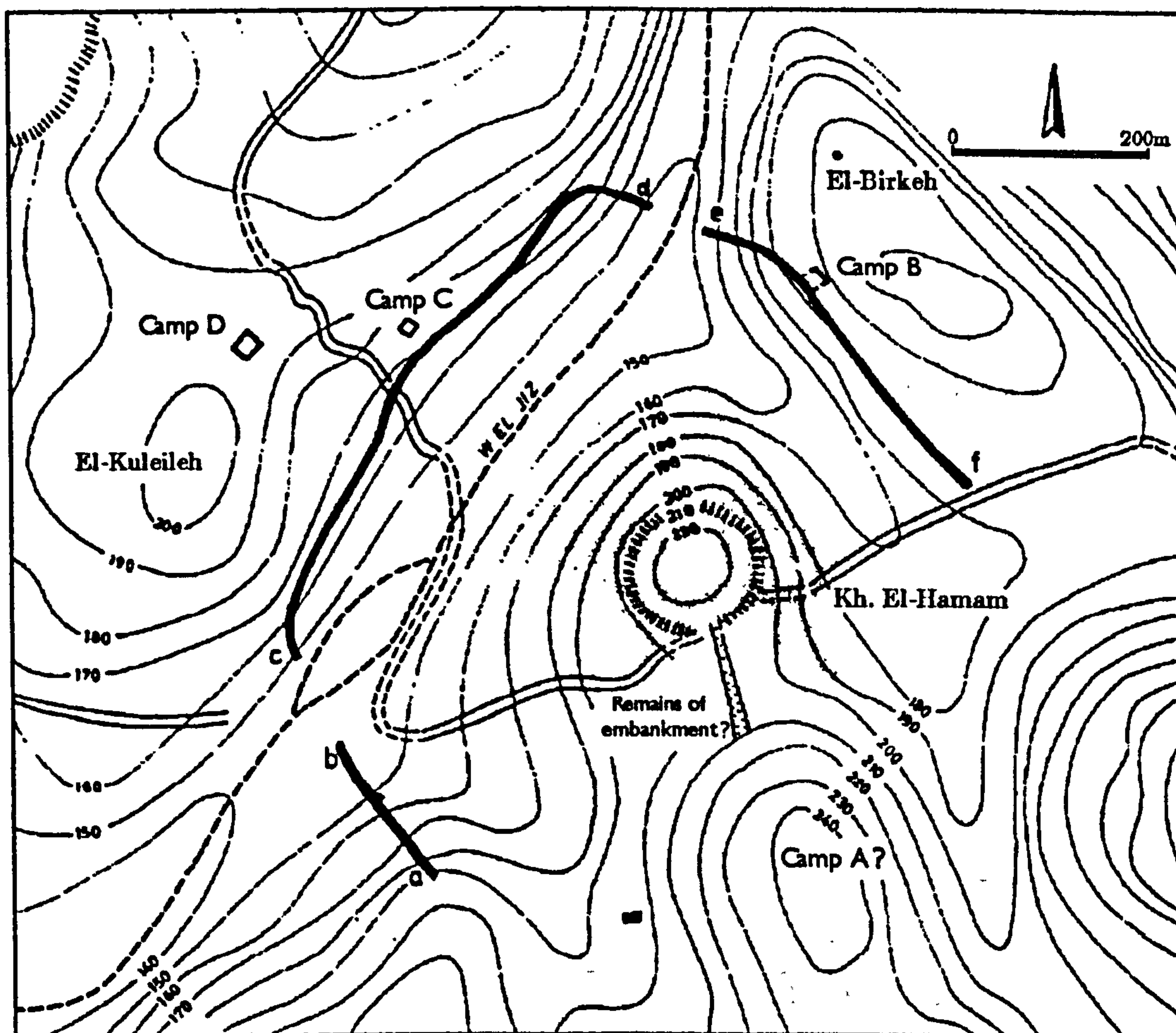


Figure 32: Narbata (Khirbet el-Hamam) (cf. pp. 119ff.)

(after Zertal 1995)

Camp A is suggested on topographic grounds only; on the putative siege embankment, see pp. 154f.

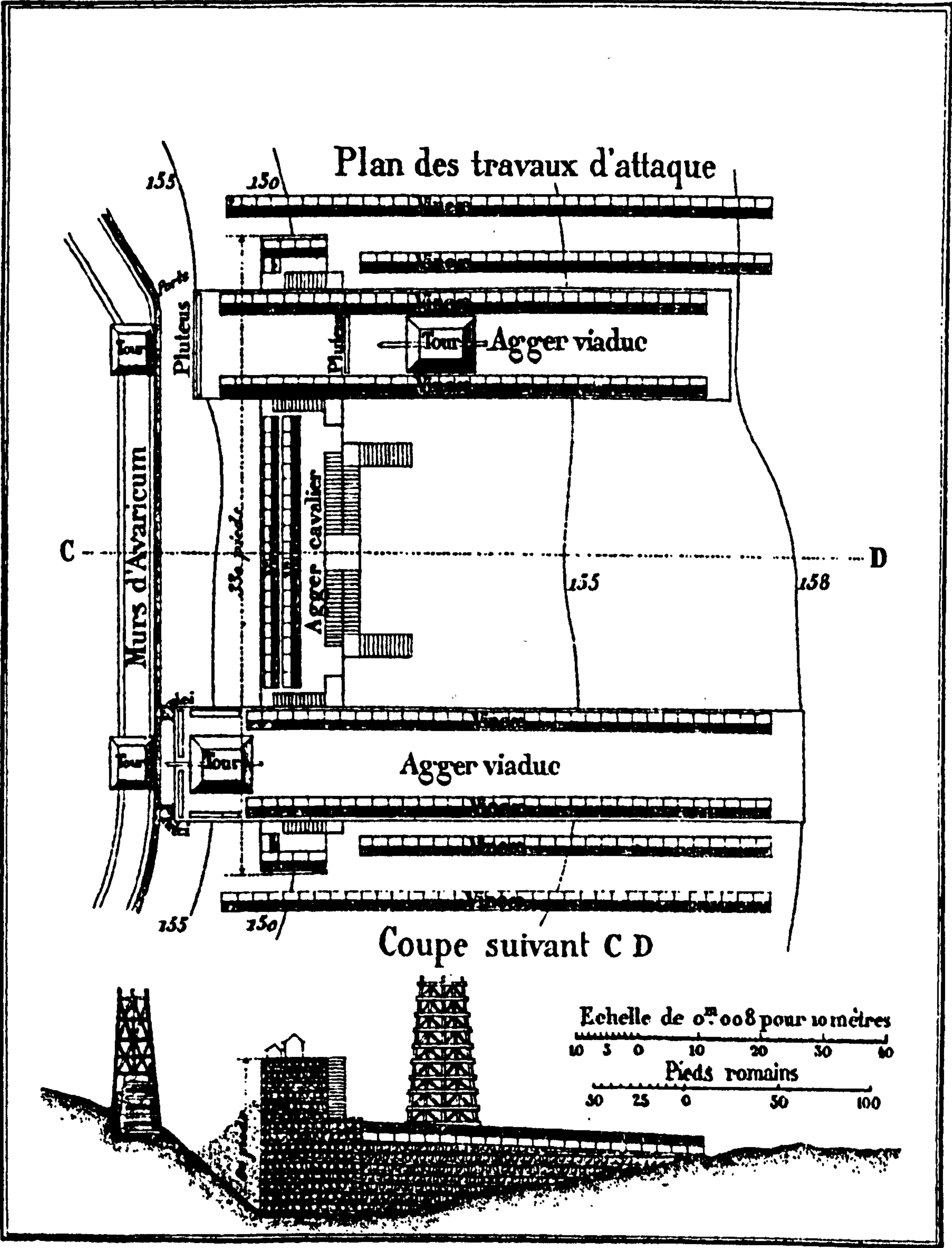


Figure 33: Avaricum: the embankment, according to Napoléon III

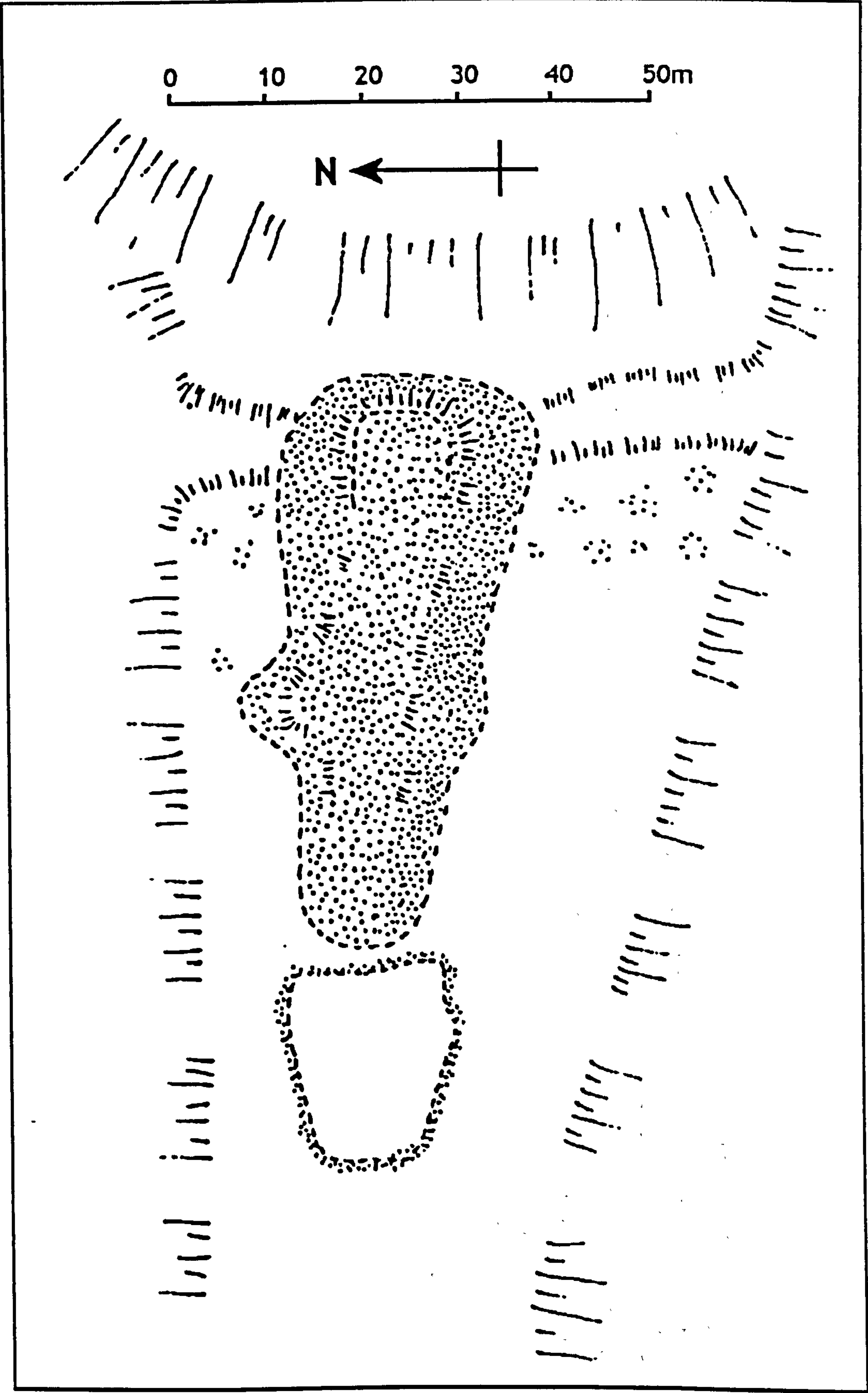


Figure 34: Machaerus: the embankment (after Strobel)

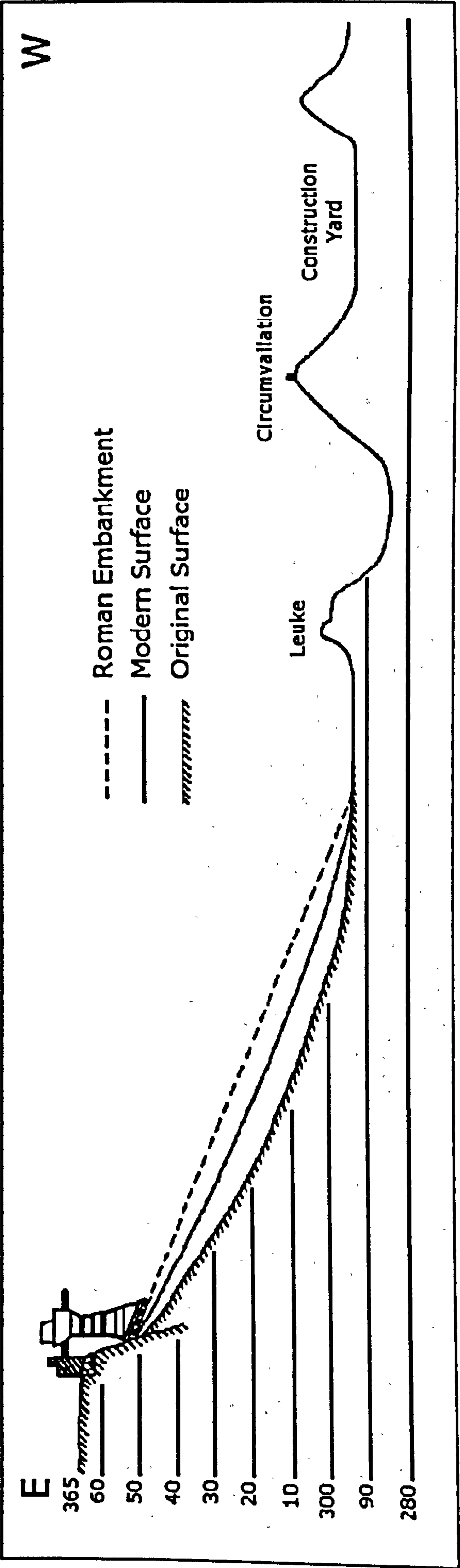


Figure 35: Masada: the embankment (after von Lammerer)

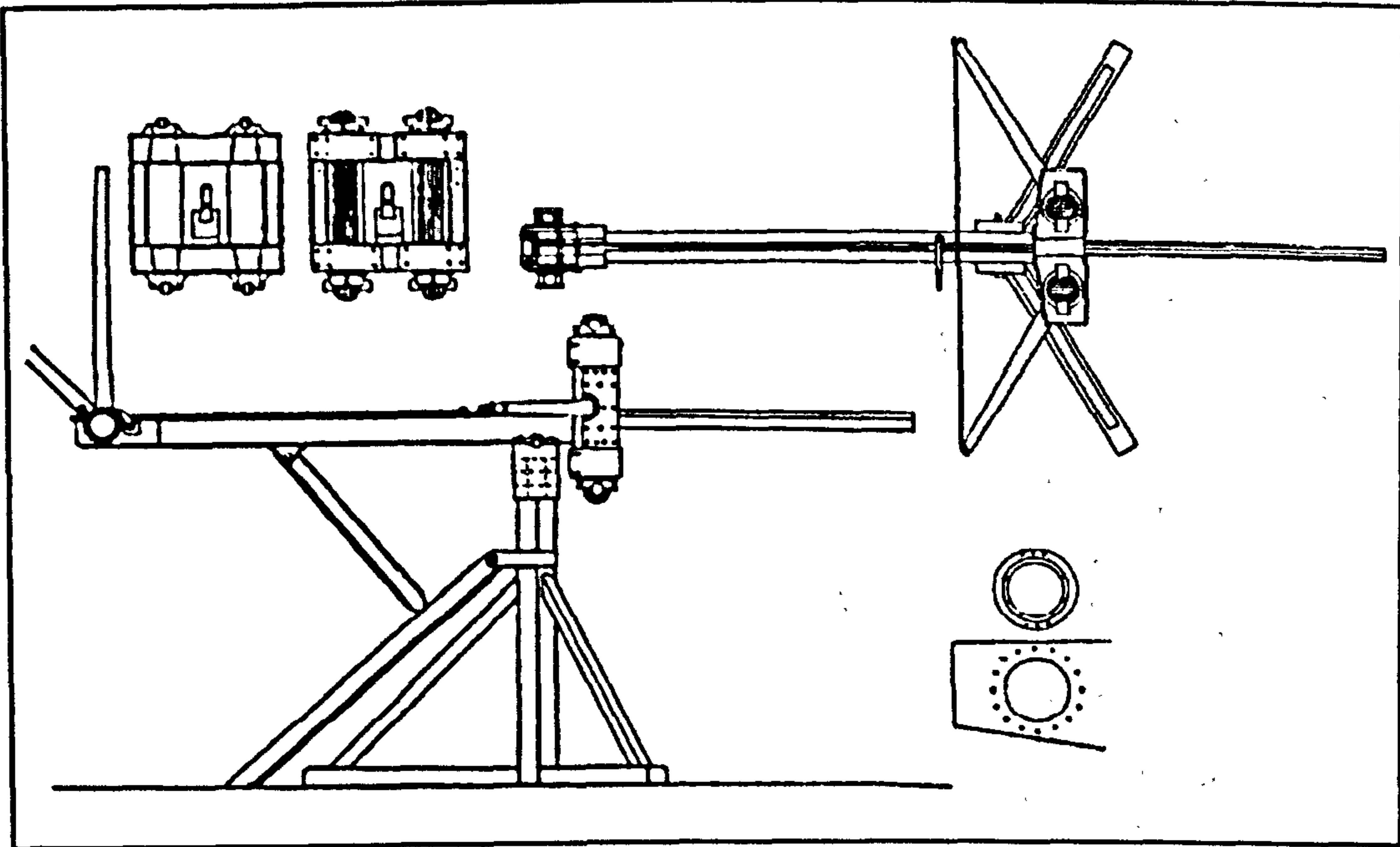


Figure 36a: *Catapulta* (arrow-firer) from Ampurias (after Schramm)

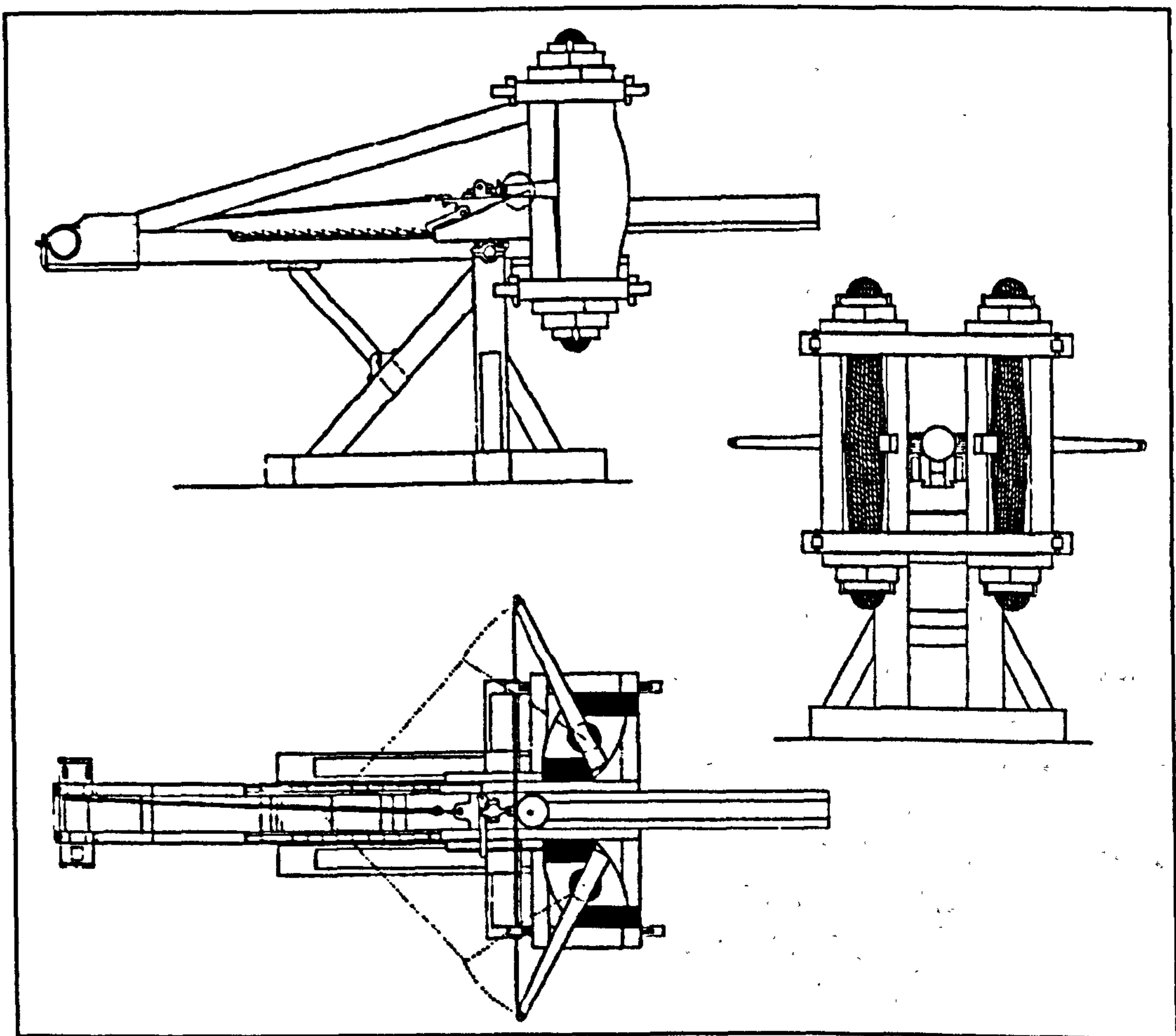


Figure 36b: *Ballista* (stone-projector), according to Vitruvius (after Schramm)

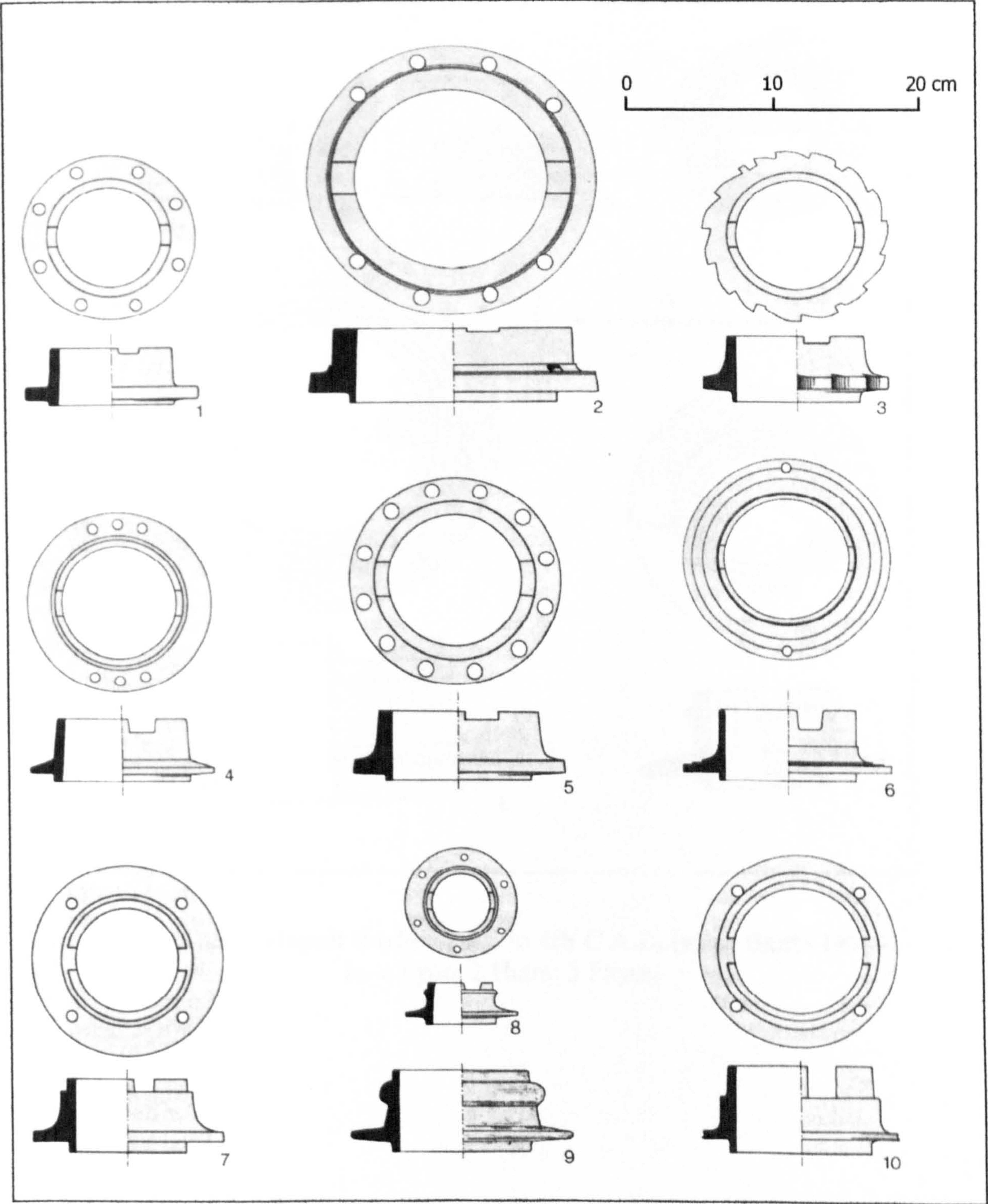


Figure 37: Catapult washers, 3rd C B.C. to 1st C A.D. (after Baatz 1994)
1–3 Ephyra; 4 Ampurias; 5 Mahdia; 6 La Caridad;
7 & 10 Cremona; 8 Bath; 9 Auerberg

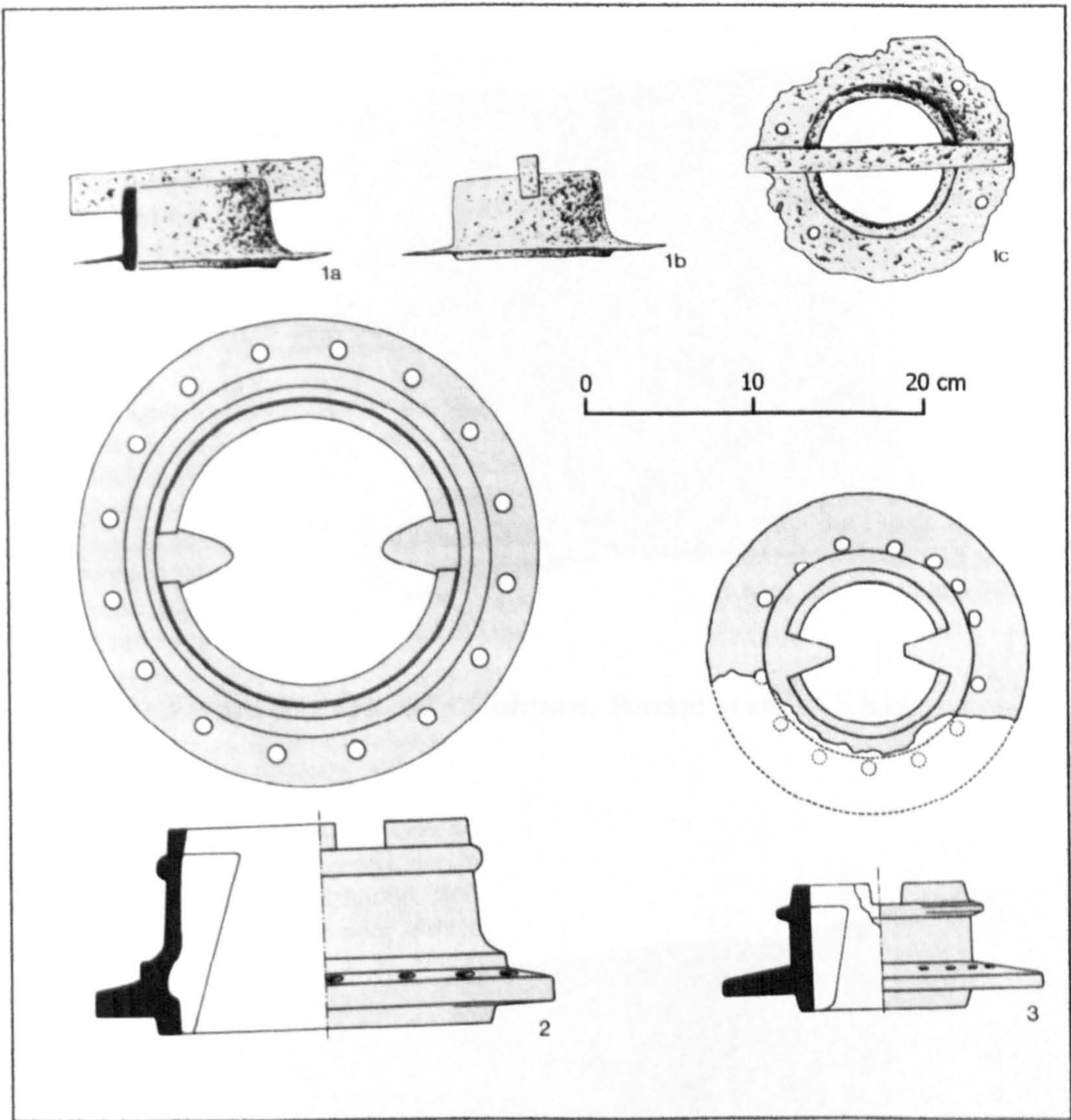


Figure 38: Catapult washers, 3rd to 4th C A.D. (after Baatz 1994)
1a–c Lyon; 2 Hatra; 3 Pityus

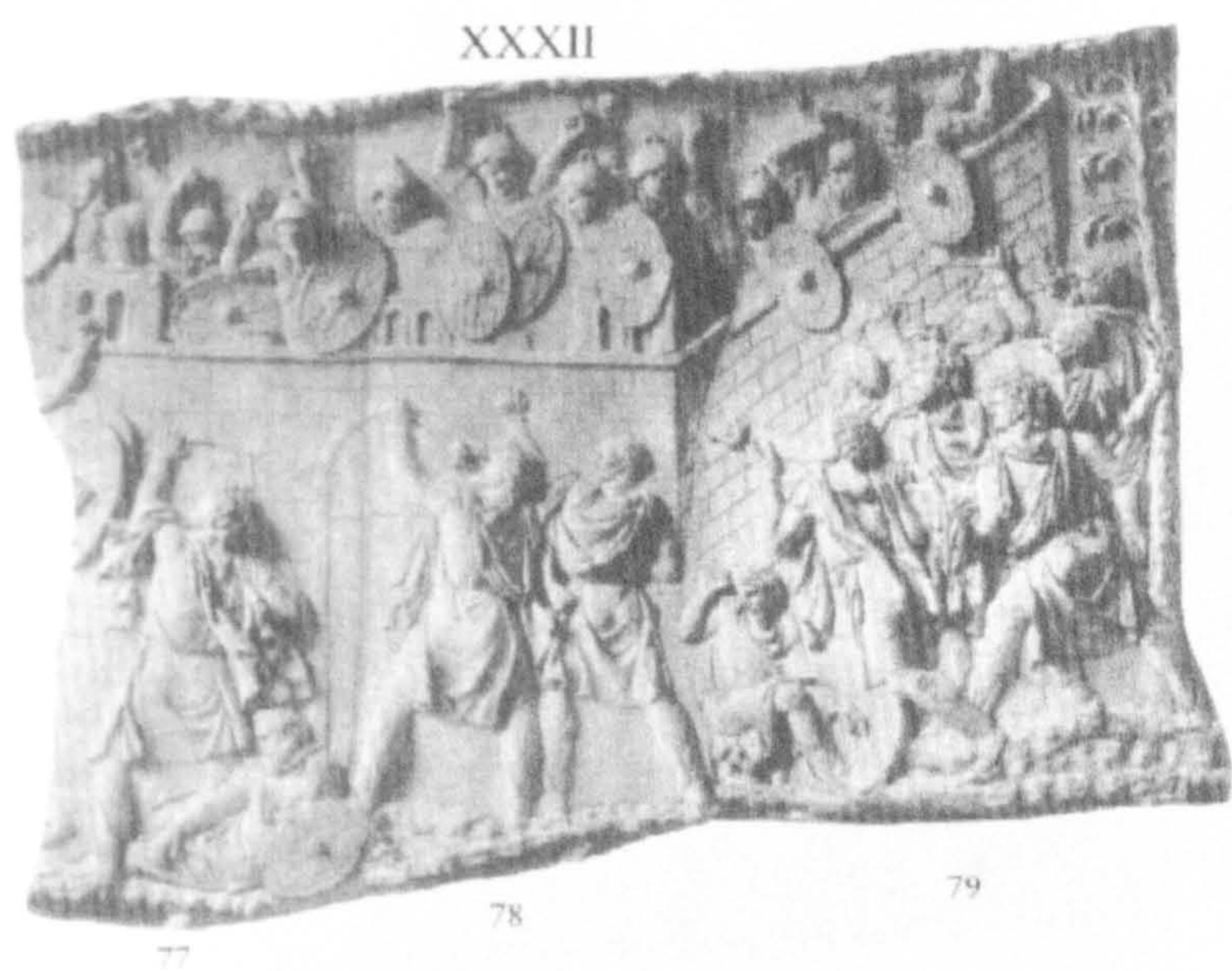


Figure 39: Trajan's Column, Rome: scene XXXII

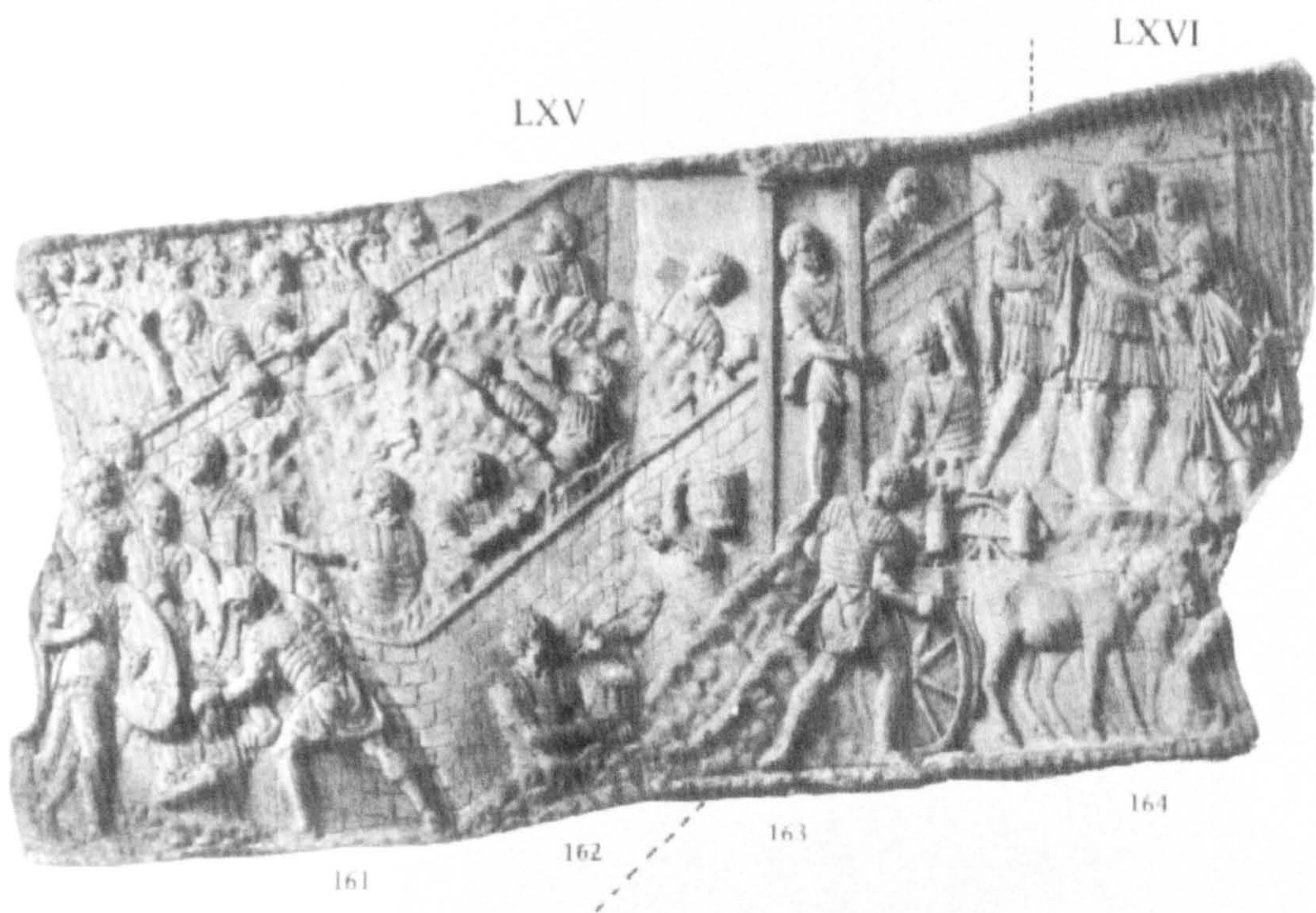


Figure 40: Trajan's Column, Rome: scene LXV–LXVI

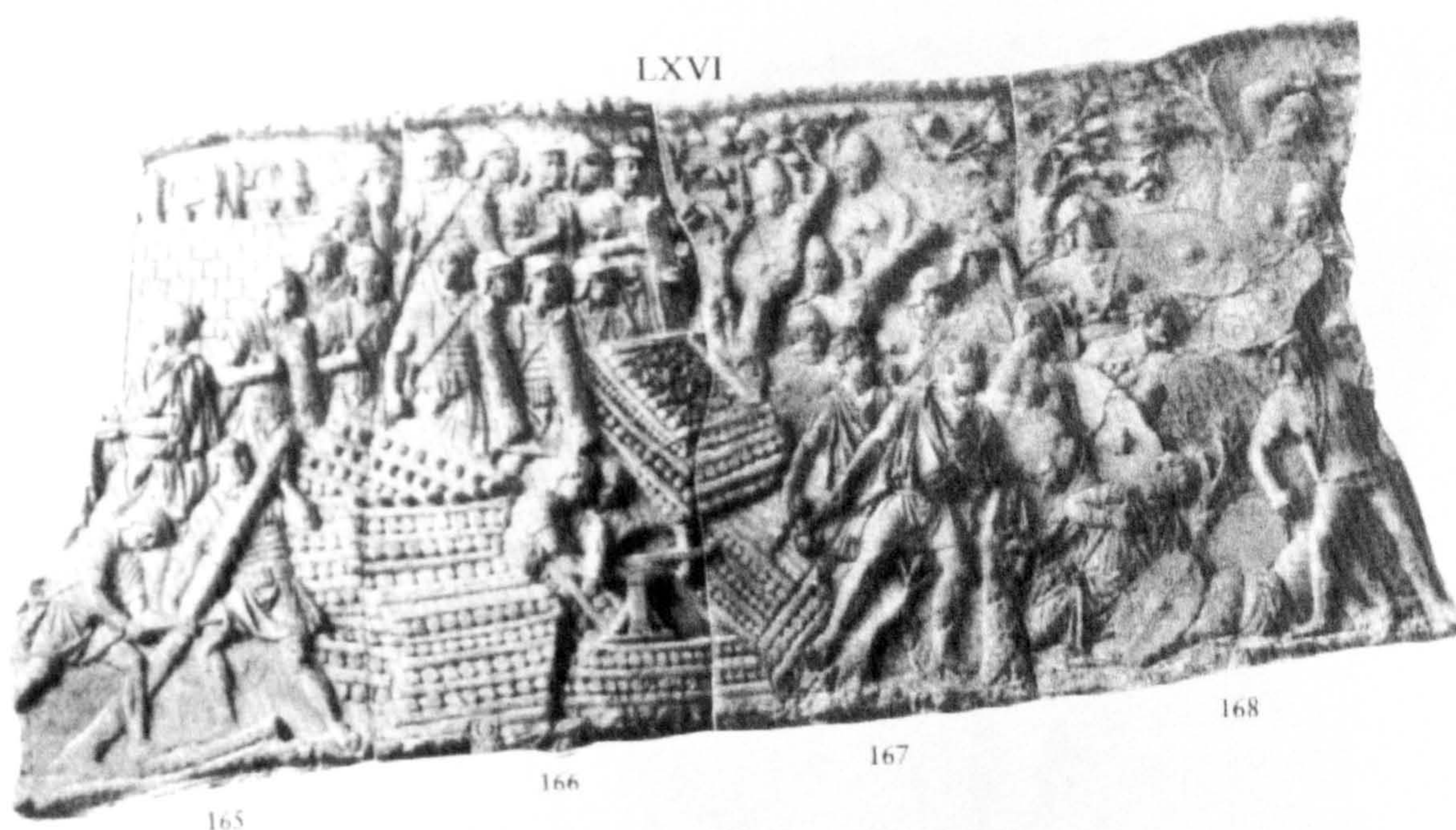


Figure 41: Trajan's Column, Rome: scene LXVI

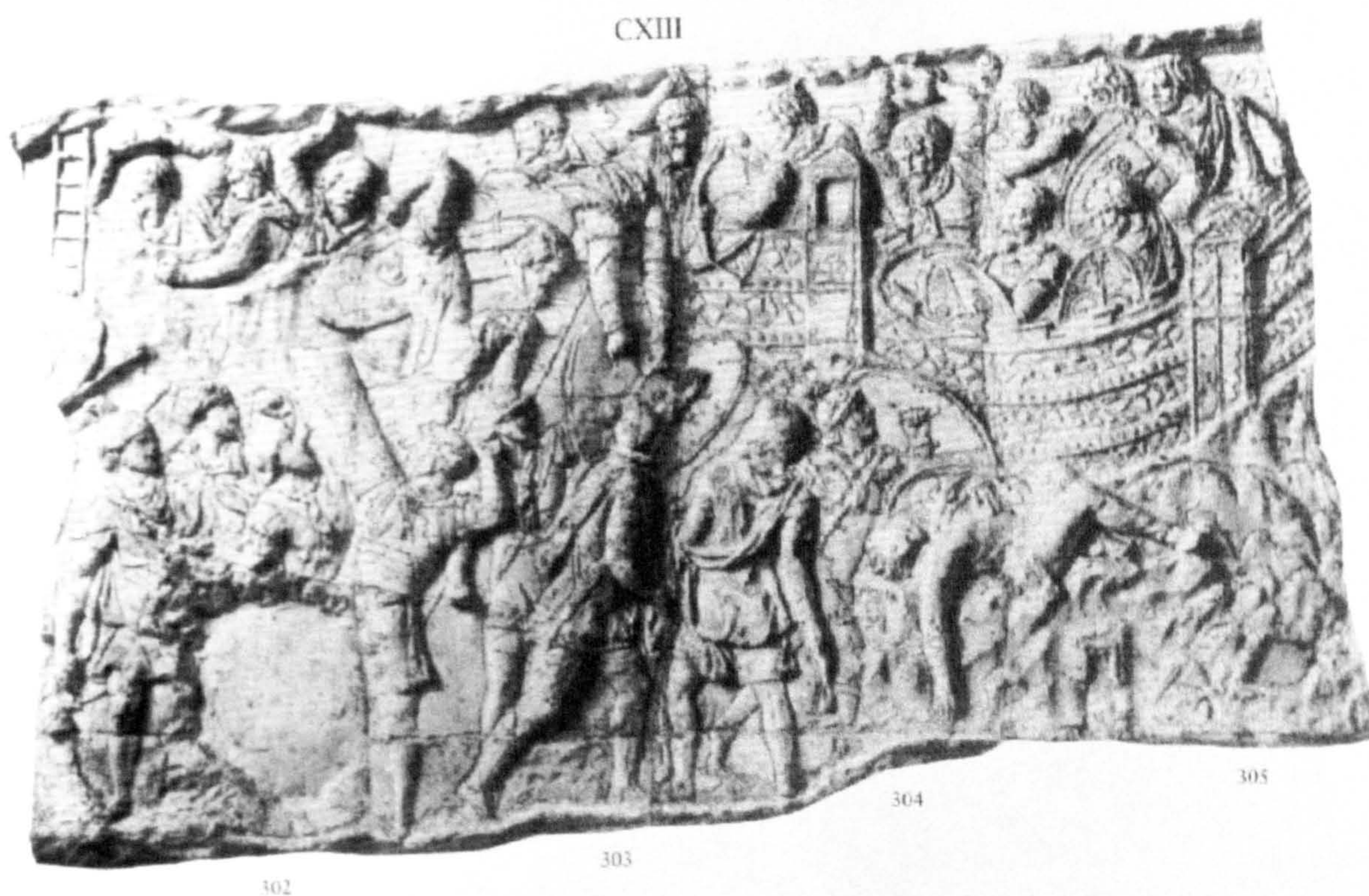


Figure 42: Trajan's Column, Rome: scene CXIII

CXIV

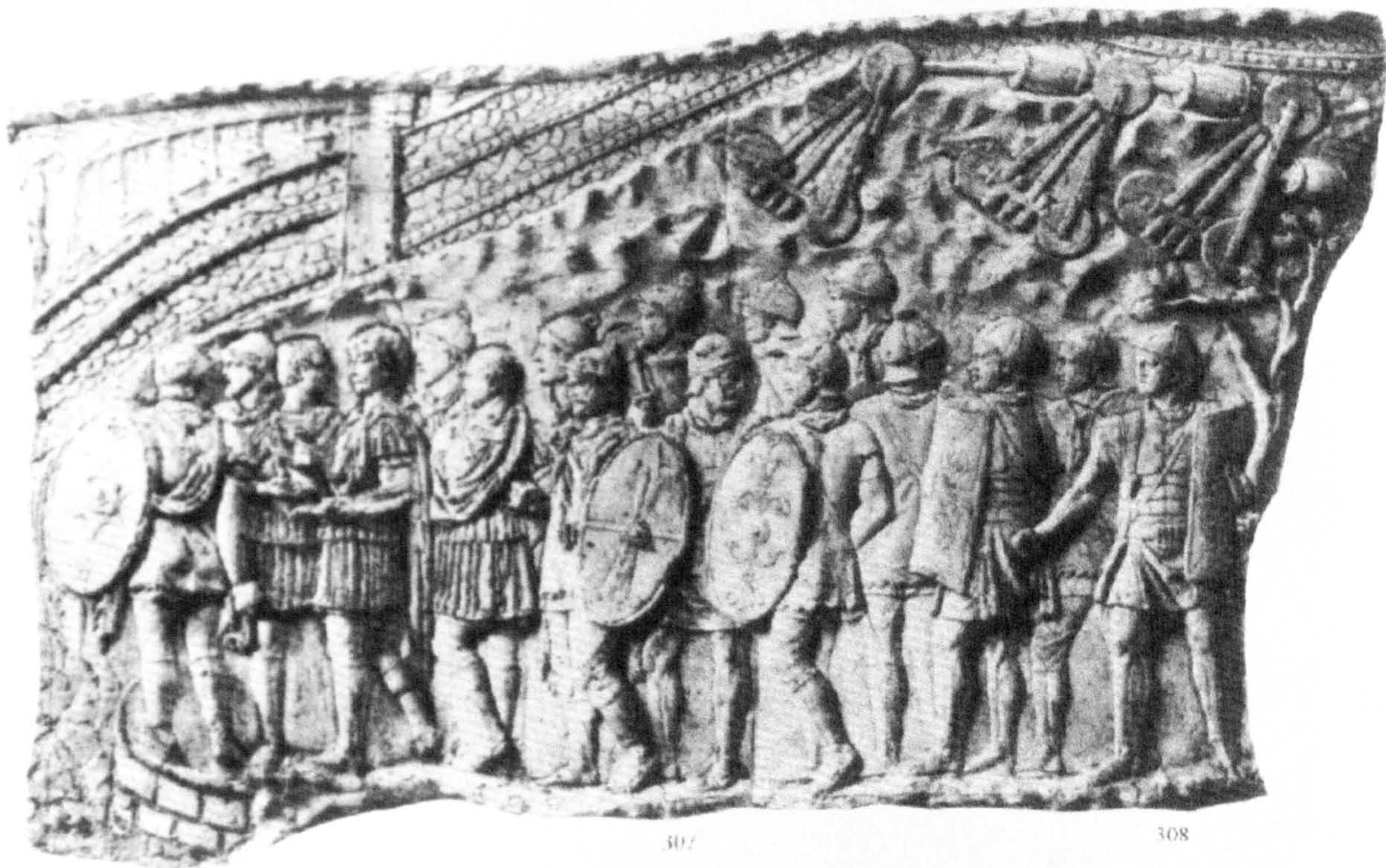


Figure 43: Trajan's Column, Rome: scene CXIV

CXVII

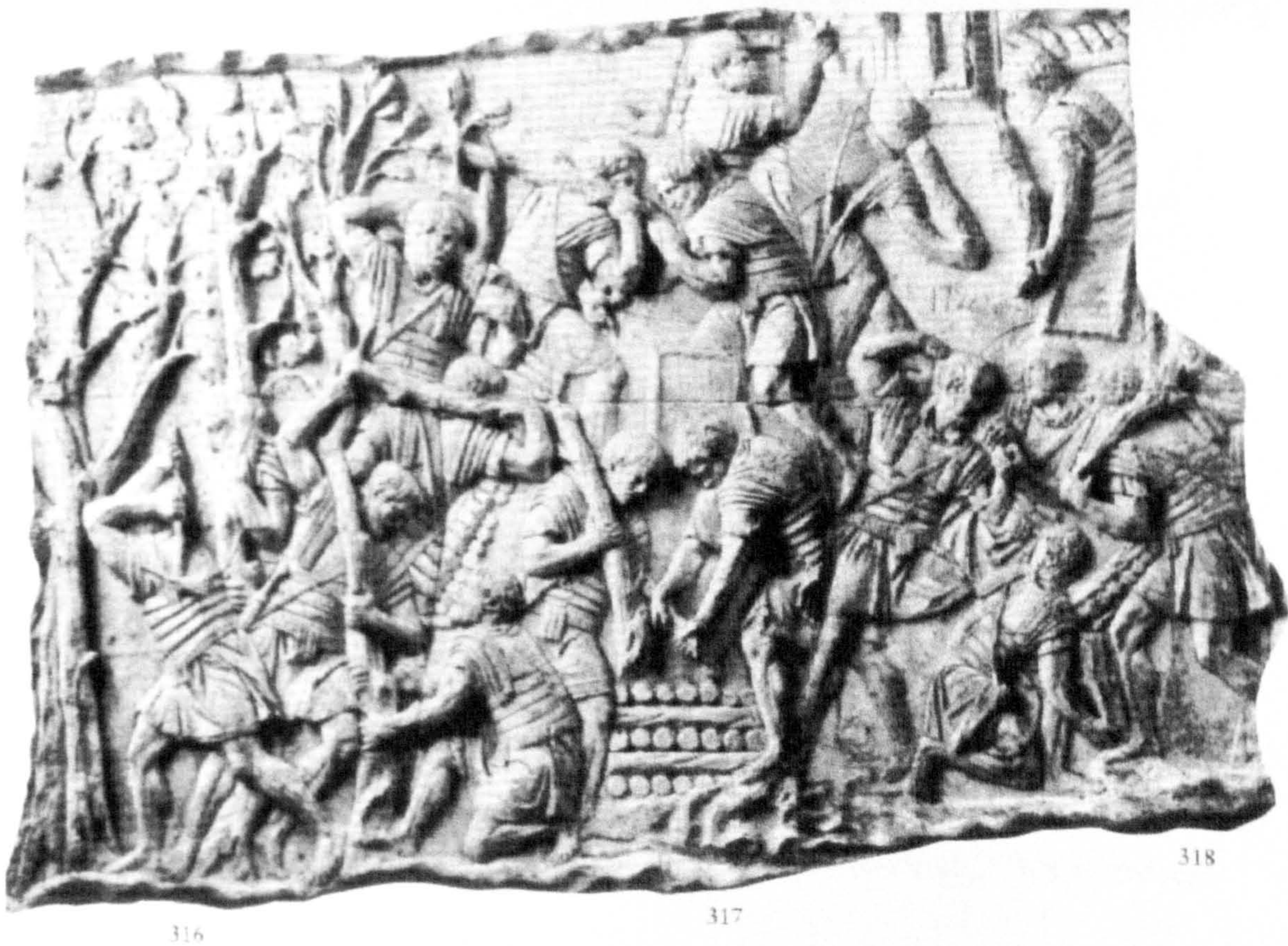


Figure 44: Trajan's Column, Rome: scene CXVII

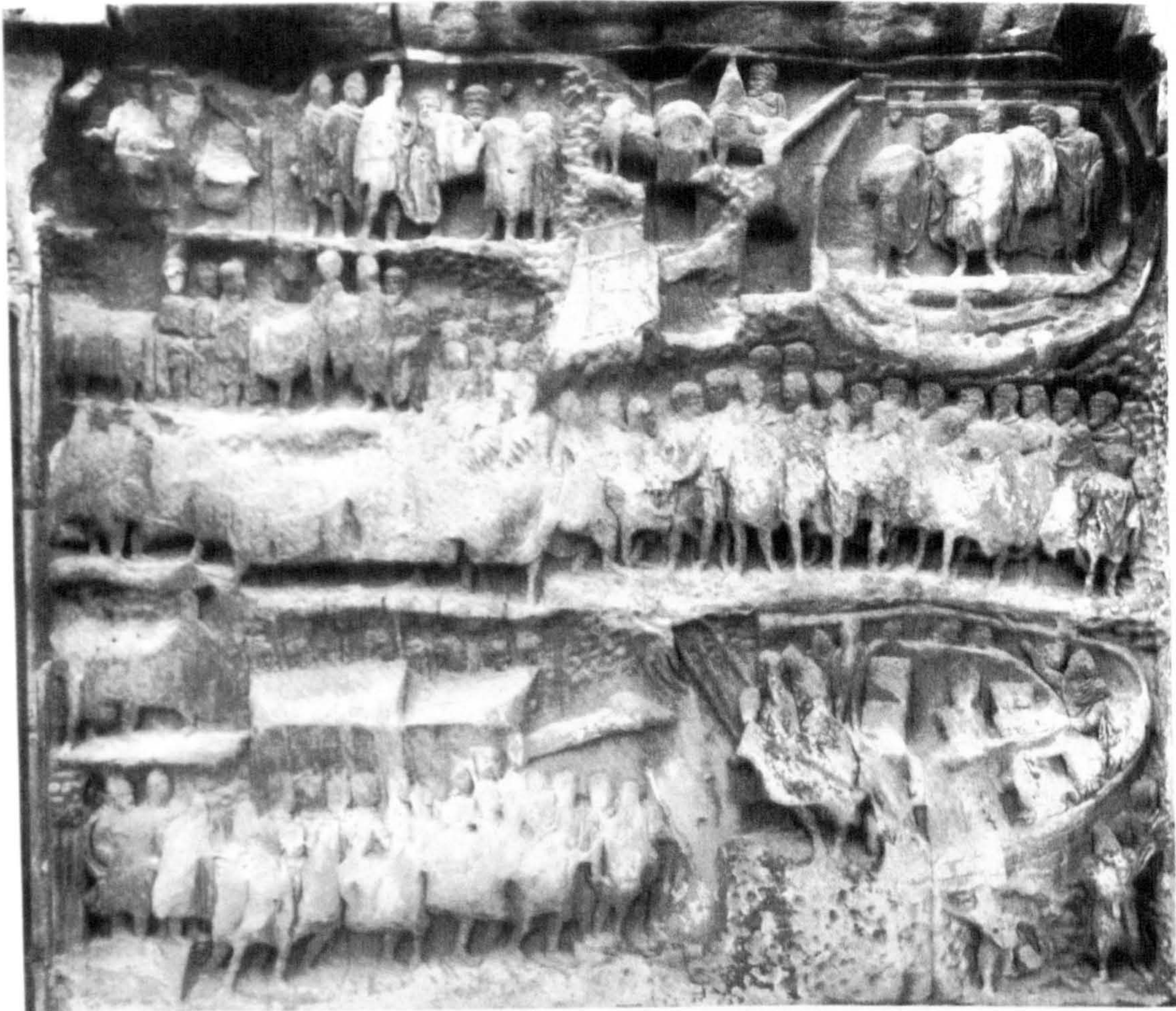


Figure 45a: Arch of Septimius Severus, Rome: panel 2

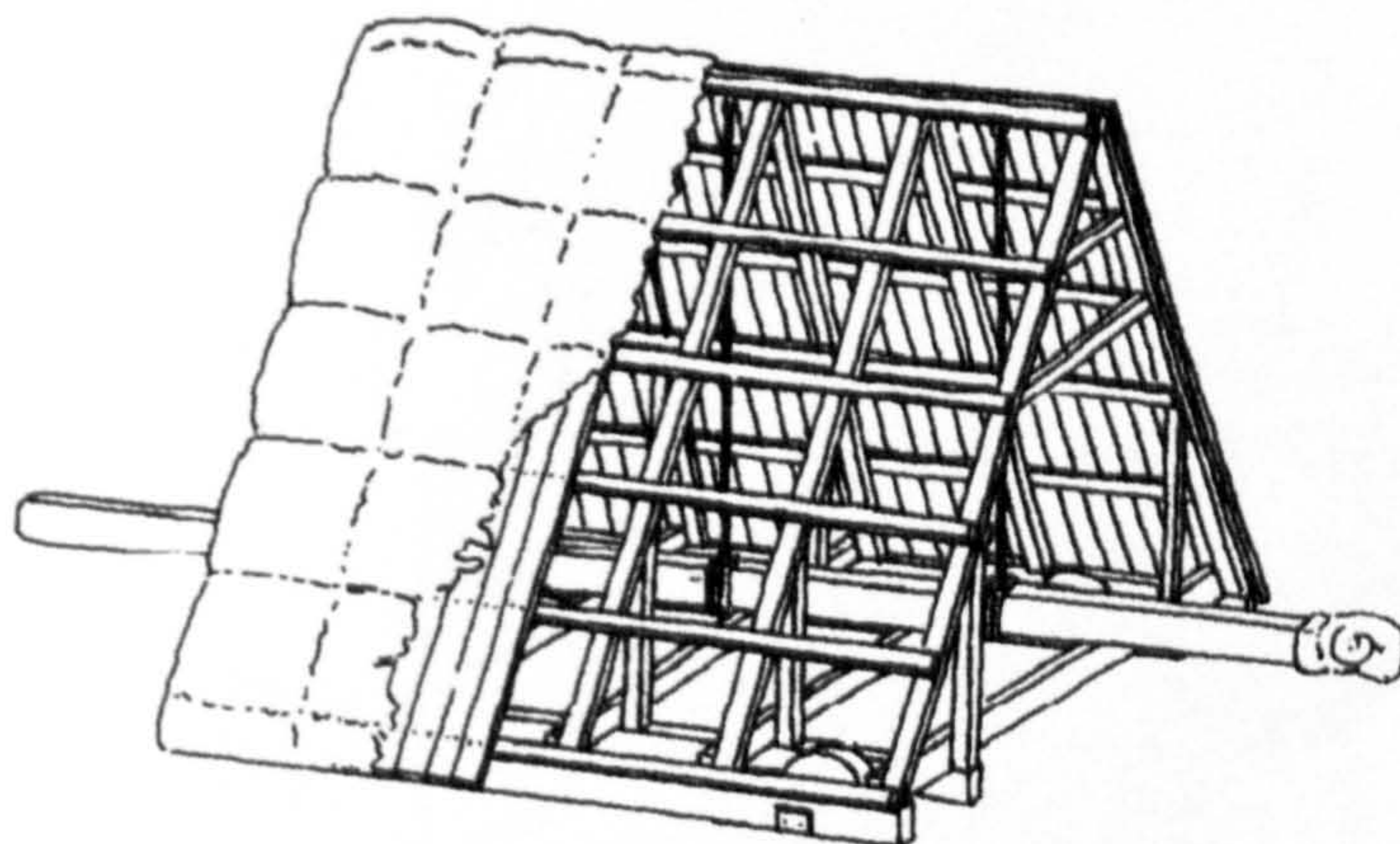


Figure 45b: Artist's impression of Roman ram-shed (after Lendle)



Figure 46a: Arch of Septimius Severus, Rome: panel 4

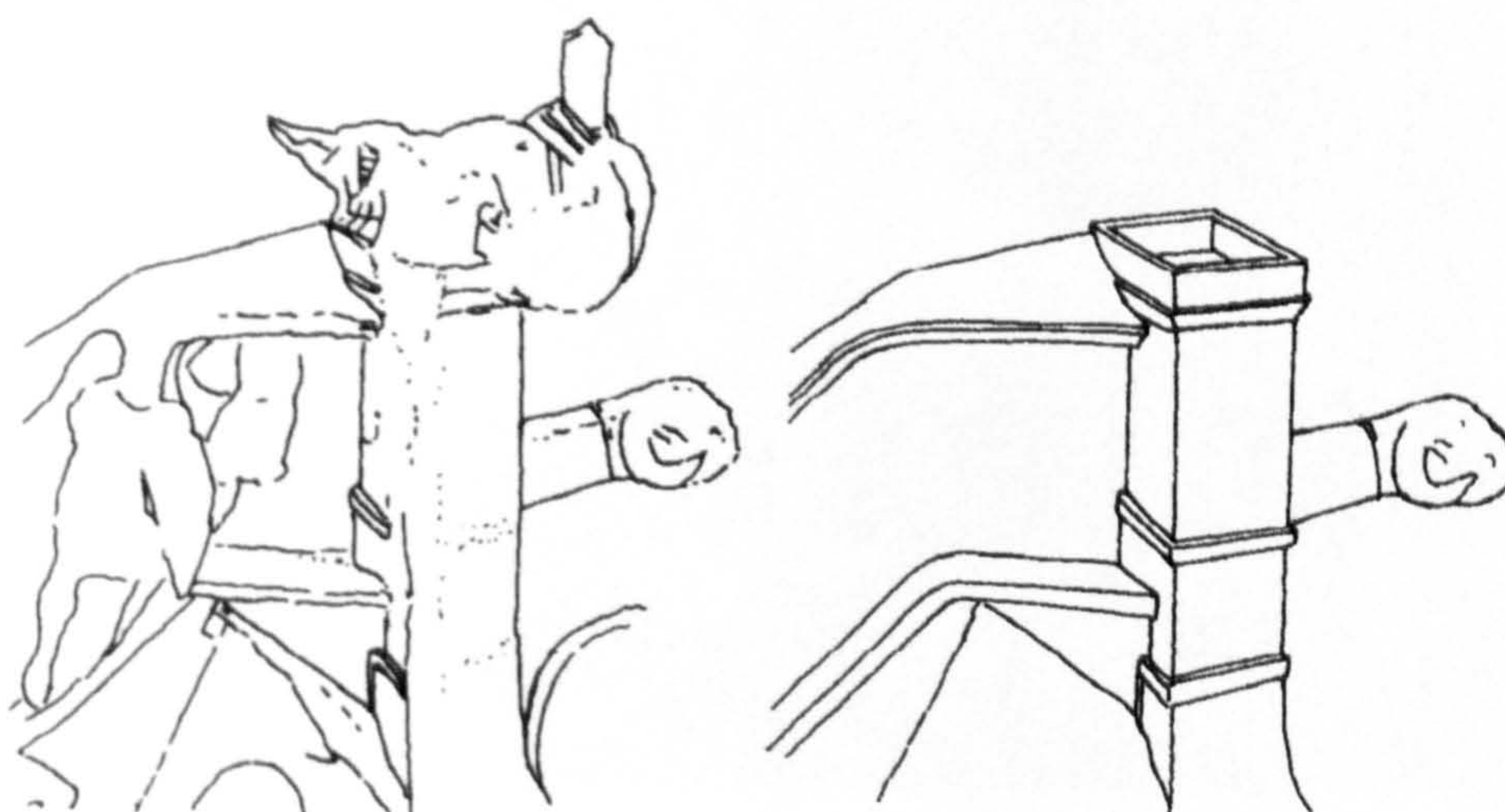


Figure 46b: Roman siege-tower with battering-ram (after Lendle)



Figure 47: Gamala: view from east
(Photo: DBC)



Figure 48: Gamala: ballista balls (ca. 7 cm diameter = ca. 1 kg)
(Photo: DBC)



Figure 50: Herodium: stone balls from the fortress interior (Photo: DBC)



Figure 49: Gamala: wall-breach south of synagogue (Photo: DBC)



Figure 51: Masada: eastern circumvallation in Wadi Sebbe, rebuilt
(Photo: DBC)



Figure 52: Masada: Camp C, with eastern circumvallation
(Photo: DBC)



Figure 53: Masada: view west from fortress towards Richmond's "hummock" (Photo: DBC)



Figure 54: Masada: Camps E and F, with western circumvallation (Photo: DBC)



Figure 55: Masada: west side and Roman embankment
(Photo: DBC)



Figure 56: Masada: Roman embankment: view from Masada
(Photo: DBC)



Figure 57: Hatra: view from north with traces of circumvallation
(Photo: DBC)



Figure 58: Hatra: accumulated *ballista* balls
(Photo: DBC)



Figure 59: Hatra: *ballista* balls (ca. 6-8 cm = ca. 0.5-1.0 kg)
(Photo: DBC)



Figure 60: Hatra: *ballista* ball (ca. 10 cm = ca. 2 kg)
(Photo: DBC)